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OREGON AGRICULTURAL COLLEGE

BIENNIAL REPORT
OF THE
BOARD OF REGENTS
1912-1914



COLLEGE BULLETIN

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OREGON AGRICULTURAL COLLEGE

BIENNIAL REPORT OF THE BOARD OF REGENTS 1912-1914



CORVALLIS
COLLEGE PRINTING PLANT
1915

Honorable Oswald West,

Governor of the State of Oregon.

Sir:

In accordance with the law, I herewith submit the report of the Board of Regents of the Oregon State Agricultural College for the biennial period ending December 31, 1914, including the report of the President of the College and the appended reports of the Treasurer and of the Director of the Experiment Station and other officers.

Respectfully submitted,

J. K. WEATHERFORD,

President of the Board of Regents.

January, 1915.

OREGON AGRICULTURAL COLLEGE

PRESIDENT'S BIENNIAL REPORT

1912-1914

To the Board of Regents:

The President of the College has the honor to submit to the Board of Regents his report for the years 1912-13 and 1913-14, together with a statement of the condition of the College, an estimate of its needs, and certain recommendations regarding its future development.

It is a pleasure to be able to report a continuation of the rapid growth of the preceding biennium. There has been a large increase in student enrollment and in the instructional force; requirements for admission have been increased, and the standard of work advanced; the courses of study have been revised and strengthened; additional equipment has been provided; new buildings have been constructed; some of the older buildings have been remodeled, and other improvements have been made, all of which greatly add to the facilities for thorough and efficient work throughout the institution.

By far the most important matters affecting the work and policy of the College, and determining the direction and extent of its future development, have been (1) the passage by the State legislature in 1913 of laws providing a permanent income for the support of the College, including the mill-tax levy for Resident

Instruction and continuing annual appropriations for the Extension Service; (2) the passage by the United States Congress in 1914 of the Smith-Lever

Important
Legislation.

Bill, which provides for cooperation between the Federal Government and the land-grant colleges in the several states in carrying on different phases of extension work in agriculture and home economics; and (3) the orders issued by the Oregon State Board of Higher Curricula defining the function and field of the State Agricultural College and the position this institution shall occupy in the educational system of the State.

1. As stated in the President's last biennial report, "One of the great problems in modern education is to get the institutions of higher learning on a business-like financial basis. Any large industrial enterprise, if successful, outlines its policy for a term of years, and provides in its budget for all the different purposes according to the nature of the business and the character and extent of its operations. An educational institution on its financial side should be regarded as a great business enterprise, and everything about it should be as strictly managed in accordance with up-to-date business principles as is any commercial institution. But in a college or university that is dependent upon periodical appropriations for support, this is impossible. That permanent funds be provided, is important for the reason that it is necessary to know, at least approximately, for some time in advance, what the income will be in order that definite plans may be made for the future. This would insure the highest standard of efficiency in the work, as well as the most advantageous and economical development of the plant."

Permanent
Financial
Support.

An institution of higher learning dependent upon the State for support may be permanently financed either by fixed continuing appropriations or by millage-tax levies. Neither of these is ideal. Under continuing appropriation measures providing a fixed annual income, no provision is made for the increased requirements of the institution occasioned by its growth. The advantage of the State tax levy, on the other hand, is that it provides a permanent income that increases with the growth of the State. The disadvantage of this plan, however, is that the increase in the income derived from the millage tax, and the increase in student enrollment and institutional requirements, may not run parallel,

Millage Tax
and Continuing
Appropriations.

in which case the income from the tax would be either inadequate or unnecessarily large.* The former is more likely to be true, particularly in a new and rapidly growing state where the demands upon an educational institution such as the Agricultural College are likely to precede and to be greatly in excess of the development of the state and the corresponding increase in the value of its taxable property. A combination of these two plans is generally found

*See President's Report, Oregon State Agricultural College, 1910-12, pp. LXIX-LXXI.

to be most satisfactory, definite continuing appropriations being provided for certain specific purposes, and the mill-tax levy furnishing the income necessary for the regular instructional work and the development of the plant necessary in providing therefor. This is particularly true of the Oregon State Agricultural College. The extent and character of its activities are such that neither plan alone would be adequate. The two together, however, as provided at present by the State legislature, give permanent financial support in a way best adapted to the varying needs of the institution.

The general support of the College, including the requirements for maintenance, equipment, permanent improvements, buildings, land, etc., is provided for through the mill-tax levy. The income for the Experiment Station work, including the branch stations

Sources of Financial Support. in different parts of the State, is derived from Federal appropriations and special continuing State appropriations. The State appropriations required for this work have been provided by different special legislative enactments, according to the location, extent, and character of the work, and the cooperative assistance received either from the Federal Government or from other sources. The Extension Service is financed through the act of the State legislature passed at the session of 1913. It is generally recognized throughout the country that this Oregon extension law is one of the best and most comprehensive laws of the kind in the United States. Under its provisions, as fully explained elsewhere in this Report, the extension work of the College is largely cooperative, funds therefor being provided by the State, the Federal Government, and different counties of the State.

2. The cooperative extension act passed by Congress in 1914 is one of the most constructive educational measures ever adopted by the United States Government. Heretofore the United States Department of Agriculture has engaged in certain phases of extension work in different states. Through a lack of proper understanding and coordination, however, there has

Smith-Lever Federal Law.

been more or less duplication of effort, with corresponding waste and impairment of efficiency. The Smith-Lever Act provides for cooperation in all extension work between the United States Department of Agriculture and

the land-grant institutions in the several states. "It guarantees," as sated by Secretary Houston, "a coordination of the forces of the two jurisdictions, places the brains of the two great agencies in conjunction, eliminates waste and friction, and insures efficiency."

It is now generally recognized that one of the most important lines of activity in which the agricultural colleges are engaged, is in the field of agricultural extension. In no other state in the Union is the need for such work greater than in Oregon. With its large area, small population, and great variation in elevation and climate, the conditions in Oregon are such that farm demonstration and other phases of extension work are not only of the greatest importance in the development of the agriculture of the State, but they are also relatively most expensive. It is a great achievement, therefore, that all the forces available for extension work, Federal and State, should be brought together under a cooperative plan such as to insure the accomplishment of the greatest possible good.

3. In 1909 the State legislature passed a law establishing the State Board of Higher Curricula, the duties of which were "to determine what courses of study or departments, if any, shall not be duplicated in the higher educational institutions of Oregon, and to determine and define the courses of study and departments to be offered by each such institution." After having investigated

State Board
of Higher
Curricula.

the conditions at the educational institutions, the Board gave public hearings, as required by law, and in April, 1910, issued an order as published in the Report of the President of the College for that year, making a certain division of work as between the State Agricultural College and the State University. The most important feature of this order was that certain engineering work might be continued at both of these institutions. This, however, appeared not to have been entirely satisfactory, the claim being made that conditions in this State were not such as to warrant the maintenance of duplicate courses in engineering, with the necessary equipment for the work thereof, in each of the two State institutions.

Soon after the adjournment of the State legislature in 1913, therefore, the Board of Higher Curricula resumed its investigations, which continued over a period of about a year. Several

public hearings were given, and orders were finally issued requiring that all engineering courses should be centered at the Agricultural College, and otherwise defining the work of the two institutions so as to avoid a duplication of courses and to insure, as it was thought, the development of each institution in its own distinctive field in a way best to serve the interests of the State. By this order the interpretation of the function and field of the Agricultural College is in strict accord with the provisions of the organic act of Congress passed in 1862, and the acts of Congress supplementary thereto.

Engineering
work Centered
at the College.

The distinctive work of the Agricultural College is thus placed in the field of applied science, or technical education. Provision is also made, of course, for the necessary basic work in the natural and physical sciences, and for instruction in the general subjects that constitute an essential part of all college courses.

College
Field
Outlined.

With the different divisions of College work permanently financed, therefore, as indicated above, and the field of its activities clearly defined, a stability of policy, otherwise impossible, is insured; and the College, for the first time in its history, is placed in a position where it can devote its energies uninterruptedly to positive, constructive effort, thereby insuring the most economic expenditure of its funds and the attainment of the highest degree of efficiency.

Stability
of Policy
Insured.

STUDENTS.

The total number of different persons who received instruction in the College during the year 1912-13 was 2,314; during the year, 1913-14, 2,435. These include regular matriculates in the full-year courses and those who attended the winter short courses and the summer session, but do not include persons enrolled in correspondence or other extension work. For purposes of comparison, the students in each of these three divisions during the past four years are listed in the following table:

	1910-11	1911-12	1912-13	1913-14
Regular matriculates.....	970	1,142	1,364	1,579
Winter short courses.....	649	1,583	852	669
Summer session.....	156	143	98	187
Totals.....	1,778	2,868	2,314	2,435

It will be observed that the number of students in the regular-course work has rapidly increased, the advancement during the three years being from 970 to 1,579. The decrease during the past two or three years in the enrollment in the winter short courses is largely due no doubt to the short course work provided for in different parts of the State through the College Extension Service.

During recent years there has been a greater relative increase in the number of women students than of men. In the regular four-years courses, the enrollment of women increased during the four years, 1910 to 1914, from 265 to 493, or 86 per cent. During the same period, the enrollment of men increased from 705 to 1086, or 54 per cent. The ratio of men to women, not including those registered in the short courses and in the summer school, is approximately two to one.

The distribution of students among the different courses is indicated in the following table, which, for purposes of comparison, covers the four years, 1910-11 to 1913-14, inclusive.

	1910-11		1911-12		1912-13		1913-14	
	Full-year	Short course	Full-year	Short course	Full-year	Short course	Full-year	Short course
Agriculture	237	527	303	1432	429	621	496	521
Forestry	31		32	6	51	3	81	
Home Economics....	147	168	213	103	270	201	326	126
Engineering and Industrial Arts.....	286	10	282	28	299	12	302	3
Commerce	123	11	145	14	143	15	160	19
Pharmacy	48		55		51		69	
Optional	22		21		59		86	
Music	76		91		62		59	
Summer School		174		143		98		187
Totals	970	890*	1142	1726	1364	950	1579	856

The registration for the year 1914-15 is incomplete, as many students enter in January and at the opening of the second semester. The enrollment to date, however, shows an increase over that of the preceding year of 114. This is evidence of a remarkable growth, considering the fact that at the beginning of the present school year the standard had been advanced by adding the equivalent of one year's high school work to the requirements for admission. Under the circumstances, indeed, the showing would have been

Increased
Enrollment
Present
Year.

*Includes 82 names counted twice.

regarded as favorable had there been no increase in student enrollment during the present year.

There has been a gradual increase during recent years in the age of College students. In 1912-13, the average age of students in the secondary or vocational courses was 18 years; in 1913-14, 19 years. The difference in the age of students in the regular degree courses is not so great, the increase from 1912-13 to 1913-14 being from 19.7 to 20.1 years. The average age of the graduating class in 1913-14 was 22.4 years.

Age of
Students.

As shown in the report of the Registrar, the student enrollment during each year of the biennial period covered by this report represents every county in Oregon; and, in the year 1912-13, 38 different states and 10 foreign countries, and in 1913-14, 34 different states and 8 foreign countries. During the second year of this period, the number enrolled from Oregon was 2,018; from other states, 377; and from foreign countries, 40. The largest registration from other states was from Washington and California, with 111 students each, followed by Idaho with 32; Illinois, 18; New York, 13; and Alaska (Territory) and Maine, 7 each.

Geographical
Distribution.

As a further indication of the standard of the College work and the reputation of the institution in other states, it is interesting to note that a larger number of students enter each year from other colleges and universities. Most of the matriculates from such institutions have completed one or two years' work at the time of entering the Oregon State Agricultural College, while some of them come to this institution for the work of the senior year or for graduate study. The number who thus entered in 1912-13 was 64, and in 1913-14, 73.

College and
University
Transfers.

During 1913-14 students transferred to this institution from 33 different colleges and universities and from 9 different normal schools. As indicated in the Registrar's report, among the institutions represented in this list are included the State Universities of Michigan, Nebraska, Iowa, Washington, Oregon; and the state agricultural colleges of Kansas, Oklahoma, Connecticut, Michigan, Indiana, and Massachusetts, while a number of private colleges and universities are included, such as Willamette University, Whitman College, and Occidental College. Of the total number who received degrees from the Oregon Agri-

cultural College in 1913, 31 had transferred to this institution from other colleges and universities; and in 1914, 41.

Complete lists of the graduating classes are given in full in the Registrar's report. The number for 1913 was 104; for 1914, 172. The relatively small class in 1913 may be attributed to the fact that this year marked the transition period in the advancement of the College from the lower to the higher standard. There would have been no graduates with degrees in 1913, in fact, except for the entrance of students with advanced standing from other institutions. The class of 1915, which will exceed 220, shows a decided gain over that of 1914. The greatest increase in the number of graduates during the biennium was in the schools of Agriculture and Home Economics. In Agriculture, the number of graduates in 1914 was 57, 111 per cent greater than in 1912; while in Home Economics the number of graduates in 1914 was 46, or 39 per cent greater than in 1912. The number of graduates from the courses in Engineering, Forestry, Commerce, and Pharmacy, was about the same for the two years.

Approximately 65 per cent of the students are largely or wholly self-dependent. There is little variation from year to year in the proportion of self-supporting students. During the school year many students find employment in the College, doing office, janitorial, or shop work, or assisting in the laboratories, dormitories, orchards, barns, or on the College farms; while others secure agencies of various kinds or get employment in the city requiring only part of their time. As much as possible of the miscellaneous labor about the College, consistent with economy and efficiency, is given to students. As a means of assisting students, every effort possible is made to reduce the cost of attending the College. To this end, all laboratory, shop, and other student fees are reduced to the minimum required in purchasing the laboratory or other student supplies. Student entertainments also are limited both in number and cost, all such entertainments being under the close supervision of a faculty committee.

The Student Loan Fund, established some years ago, has been of great assistance in helping worthy students, many of whom,

without such assistance, would not have been able to complete their courses. As shown in the detailed report of the College Treasurer, printed in the appendices, the aggregate contributions to this fund, with the interest received on loans, now total \$3,660.

Since the establishment of the fund, 140 loans have been made, the average loan being about \$38. The number of loans at present totals 72, aggregating \$2,593, or an average of \$36. With a student body numbering each year between 2,000 and 3,000, particularly in an institution of this kind, the present student loan fund is entirely inadequate. This fund should not be less at the present time than \$10,000. With such a fund, a large number of the most worthy young men and women would be assisted each year in getting the advantages afforded by the College, to whom such advantages would otherwise be impossible. There are few other ways in which the same amount of money could be used to better advantage.

As submitted in the President's Report two years ago, the plan of student self-government was adopted at the Oregon State Agricultural College in December, 1910. The marked success of this movement during the first biennium has been continued during the second biennium. Members of the Student Body Council, charged with the responsibility of administering the plan, have discharged their duties with a fairness and impartiality, and yet with a firmness, that have won for them the hearty support and commendation of the entire College community. During the four years of student government there has been a gradual decrease in the number of cases requiring formal action by the Council. There has undoubtedly been a corresponding improvement in student deportment. In this institution, student self-government is thoroughly established and is universally accepted as a splendid success.

STANDARD ADVANCED.

One of the most important acts by the Board of Regents during the biennium was to advance the standard of College work. For many years in Oregon there were few high schools, and none with provision for industrial courses. Under such conditions it was impracticable to require the completion of a four-year high-

school course for admission to the College. During recent years, however, many high schools have been established in different parts of the State, there being at present, according to the report of the State Superintendent of Public Instruction, about 260. Furthermore, many of the high schools are now offering courses in industrial subjects, such as agriculture, manual training, and domestic science and art. As the number of high schools has increased and provision has been made therein for industrial subjects, correspondingly fewer students have come to the College without high-school training. The extent to which this is true is shown by the fact that as late as ten years ago there were

**Preparation
of Intrants.**

practically no high-school graduates in the Agricultural College, and comparatively few who had attended high schools at all, and these through only one or two years. Of the 670 intrants for the year 1912-13, however, only 67 entered from the eighth grade (for the secondary industrial courses); and of these, only 40 did not have access in their home towns to high-school courses through three or four years. All the others, 630, entered from high schools and academies, or from other colleges and universities. It will be observed, therefore, that, while the requirements for admission to the degree courses included only two years' high-school work, most of the students had completed at entrance the equivalent of at least three years' high-school work.

There appeared, therefore, neither necessity nor advantage in a continuation of the existing standard. Accordingly, by action of the Board of Regents on November 30, 1912, the requirements for admission to the degree courses were increased, beginning

**Entrance
Requirements
Increased.**

September, 1914, from two to three years of high-school work. In accordance with an order issued by the State Board of Higher Curricula on December 19, 1913, the Board of Regents of the Agricultural College on April 8, 1914, adopted a resolution adding another year to the entrance requirements beginning September, 1915. At that time, therefore, the College standard will be on a four-year high-school entrance basis.

These changes have been made in order that the College courses may be properly articulated with the high schools of the State, and the work adjusted on a basis such as to make it of the

greatest possible value. In the changes mentioned, however, it was not contemplated that persons without high-school training, but desiring to attend the Agricultural College, should be denied the advantages afforded by this institution. For them, vocational courses are maintained, as heretofore, which students may enter from the eighth grade. These vocational courses include agriculture, dairying, home-making, forestry, industrial arts, and commerce or business methods.

In this respect, the experience in Oregon is much the same as in other states. For many years after the establishment of the agricultural colleges, the standard of these institutions was lower than that of other institutions of higher learning. This was unavoidable under the conditions existing at that time. With the development of high schools, however, and the introduction into these schools of industrial subjects, the standard of the agricultural colleges has been advanced, particularly during the past ten years, until now, with few exceptions, all these institutions are on a four-year high-school basis, though in most states, as in Oregon, industrial courses are provided to which mature persons are admitted with less than four years' high-school preparation. The fact is, that in all the states these institutions have developed as the country has developed. They have increased their entrance requirements and advanced the standard of scholarship as rapidly as conditions in the several states would warrant.

FACULTY.

The College staff is classified into the three groups, required for the work of resident instruction, the agricultural experiment station, and the extension service. For the year 1914-15, the instructional force comprises 6 deans, 31 professors, 8 associate professors, 21 assistant professors, 69 instructors, 9 fellows, and 4 library and 10 laboratory assistants, representing the full-time equivalent of 137, exclusive of clerks and stenographers. The Experiment Station staff, including the superintendents of branch stations, aggregate 45. Of these, 18 devote their entire time to station work, while 27 give part time to resident instruction or to extension service. Excluding clerical assistance, the Experiment Station

Vocational
Courses
Established.

Faculty
Statistics.

staff represents the full-time equivalent of 29. The number of employees in the Extension Service is 33, of whom 20 give full time to extension work, and 13 devote part of their time to resident instruction or to experimental work. The Extension staff represents the full-time equivalent of 24, not counting clerical force.

Members of the faculty have attended as many as 149 different colleges and universities, including nine universities of Europe and one of Canada. They have received 200 first degrees, 66 advanced degrees, and 15 normal certificates or diplomas; while 50 have completed from one to two years' work toward advanced degrees, and 35 have attended summer sessions in different institutions throughout the country. A large number of faculty members have attended two or more different colleges and universities. Of the total number in the faculty, 63 have attended the Oregon State Agricultural College. Of these, 52 have received Bachelor's degrees, and 8 Master's degrees, while 30 have also attended other colleges and universities. The five members who have attended the Agricultural College but have not received their degrees from this institution, have either graduated from other colleges or universities, or are now employed on part time as shop and laboratory assistants while completing the work required for graduation.

The number of representatives on the faculty from different colleges and universities, exclusive of the Oregon Agricultural College, varies from one to 20, the University of Chicago being represented by 20; Cornell University, 17; University of Illinois, 16; University of California, 15; Columbia University (N. Y.), 13; University of Wisconsin, 13; Harvard University, 11; Kansas Agricultural College, 9; Iowa State College, 7; Michigan Agricultural College, 6; University of Michigan, 5; Stanford University, 5; Indiana State University, 4; Massachusetts Agricultural College, 4; Oklahoma Agricultural College, 4; South Dakota Agricultural College, 4. The following institutions are represented by three each: Yale University, University of Pennsylvania, Rochester University, Baker University, Brown University, Illinois State Normal School, Kansas State Normal, University of Minnesota,

Breadth of
Faculty
Training.

Colleges and
Universities
Represented.

University of Nebraska, Purdue University, Pratt Institute, American Conservatory of Music, Sargent School of Physical Education, Willamette University, and Wabash College. Among the other institutions represented are: Massachusetts State Normal, New York State Normal, New Mexico Agricultural College, Nebraska State Normal, North Dakota Agricultural College, Ohio Wesleyan University, University of Oregon, Oregon State Normal School, Oberlin University, Pennsylvania State College, St. Louis Law School, Stout Institute, Swarthmore College, University of Utah, Vermont University, Virginia Polytechnic Institute, Western Reserve University, Washington State University, Washington State College, Wellesley College, Wisconsin State Normal School. The foreign institutions represented are the University of Strassburg, University of Halle, University of Berlin, University of Basel, Switzerland Normal University, Fenelon College, Victoria College of Music, Royal College, Queen's University, and McDonald Institute.

COURSES AND ORGANIZATION.

Reference has already been made to the orders of the Oregon State Board of Higher Curricula determining the courses of study that should be offered by the State University and the Agricultural College. In the biennial report of the President of the College for the years 1910-12, page XVII, are published the orders of the Board issued on April 28, 1910, relative to the Agricultural College.

On June 24, 1913, notice was given that a meeting of the Board of Higher Curricula would be held on August 25, 1913, at which it was proposed:

"1. To eliminate from the University of Oregon and to assign to the Oregon Agricultural College the departments of Electrical Engineering, Chemical Engineering, and Civil Engineering, conditioned on the Oregon Agricultural College requiring a full four-years high school course or its equivalent as a preparation for entrance for degrees in all engineering courses.

"2. To eliminate from the Oregon Agricultural College and assign to the University of Oregon the departments of (a) Fine Arts, including Architecture and Music; (b) Economics; (c) Commerce (higher); (d) Education; (e) Graduate School."

Board of
Higher
Curricula.

Meetings were held at the time indicated, and the hearings were continued to December 19. On December 20, the Board issued the following orders:

"1. That the departments of Electrical Engineering and Chemical Engineering be eliminated from the University of Oregon and assigned to the Oregon Agricultural College, conditioned on the Oregon Agricultural College requiring a four-years high school course or its equivalent as a preparation for admission to all engineering courses leading to degrees.

"2. That Proposition 2 (Notice, June 24, 1913) be adopted in full, with the provision that a more particular definition of the several departments under this head shall be made in conference with the heads of the State University and the Agricultural College."

It will be observed from the above orders that no decision was reached at this meeting regarding the subject of Civil Engineering. At a meeting of the Board held on February 7, 1914, however, it was ordered:

"1. That the department of Civil Engineering be eliminated from the Oregon Agricultural College, except such courses in Civil Engineering as are required in other departments of engineering, including Highway and Irrigation Engineering, and in the departments of Forestry and Agriculture at the College. * * *

"2. That the department of Civil Engineering be eliminated from the University of Oregon." * * *

It was also ordered that there should be no further matriculation in Civil Engineering at either the Agricultural College or the State University, but that it should be discretionary on the part of the Regents of each of these institutions "to maintain the Civil Engineering Course until its completion by students matriculated prior to the date of this order."

After conference with the presidents of the two institutions, at which a statement had been agreed upon defining the several departments listed in Proposition 2, as provided in the order issued on December 20, 1913, it was ordered:

"That the several departments be defined and confined as follows:

"**Architecture.** The State University may offer work leading to degrees in architecture with particular emphasis on architectural design

and architectural history and art. The State Agricultural College may offer courses **leading to degrees*** in structural and rural architecture, including such incidental instruction as may be required in architectural design.

"Music. Music as a special subject of instruction leading to degrees shall be confined to the State University, except that the State Agricultural College may continue instruction in Music as now offered as an accessory only to the regular courses of that institution as herein defined, but no degrees shall be conferred in Music by said Agricultural College.

"Economics and Political Science. Economics and Political Science are assigned to the State University, except that the State Agricultural College shall not be required to discontinue such elementary and applied courses in these subjects as are essential to the general training of the students. Such training naturally embraces subjects underlying all good citizenship, as well as those which supplement the various technical courses of the Agricultural College. It is also understood that the State Agricultural College shall have the right to continue and develop the work in rural sociology and agricultural economics.

"Commerce. The curricula in Commerce in the State Agricultural College shall be limited to the work required for the bachelor's degree, in accordance with the orders of the Board of Higher Curricula issued April 28, 1910, and April 26, 1913, as this work will in no way interfere with or be in duplication of the work in higher commerce assigned to the State University; except that the said College shall not be inhibited from offering such advanced work in business administration and management as may be required in the agricultural, engineering, and other regular courses of the Agricultural College, except Commerce.

"Education. The School of Education shall be confined to the State University, except that the State Agricultural College may maintain a department of Industrial Education and provide for such instruction in connection therewith, or related thereto, as may be necessary in training persons to teach industrial subjects in the common and high schools in accordance with the provisions of the Nelson Amendment of 1907 to the Morrill Act of 1890, as approved in the order of the Board of Higher Curricula issued April 28, 1910.

"The Graduate School. The Graduate School as such shall be confined to the State University. The State Agricultural College, however, shall not be inhibited from offering advanced or graduate work in the different courses distinctive of that institution, except Commerce. The

*At the meeting of the Board of Higher Curricula held on March 13, 1914, objection was made to the authorization given the Agricultural College to offer work "leading to degrees" in Architecture. It was claimed that since all engineering work had been discontinued at the State University and assigned wholly to the Agricultural College, the course in Architecture leading to degrees should be confined to the University. After this question had been considered by members of the Board of Higher Curricula, the President of the College, in behalf of this institution, assented to the elimination of the words, "leading to degrees," from the second sentence in the paragraph on Architecture and waived the right under the law to thirty days' notice before

Agricultural College shall also offer graduate work in rural sociology and agricultural economics.

"Extension Work. The Extension work of the State University and of the State Agricultural College shall be confined strictly to the respective fields of these institutions as defined above."

It will be observed that by the orders of the Board of Higher Curricula the work of the Oregon State Agricultural College is not changed except that this institution may not continue the course leading to degrees in Civil Engineering. Since all engineering work is discontinued at the State University, the effect of this order is to abolish entirely the degree course in Civil Engineering. The College had not offered work in commerce beyond the requirements for the baccalaureate degree. The subjects in "higher commerce," as defined by the President of the Board of Higher Curricula, had not been provided for nor announced by this institution.* By these orders, however, the Agricultural College is inhibited from developing work in duplication of any of the distinctive courses of the State University.

The College, therefore, is left to continue the policy adopted some years ago of concentrating its efforts upon the special features distinctive of land-grant college work. The object in view in shaping this policy has been twofold: first, to make the best possible use of available resources in building up a strong institution for the promotion of agricultural and industrial education; and second, to avoid attempting work in a field that could be best covered by the State University. With increasingly large demands made upon the institution, and limited funds available both for maintenance and development, it has been thought that greater good

Civil
Engineering
Discontinued.

College Policy
Indicated.

definite action should be taken by the Board. In compliance with a provision of the law, however, the Secretary issued a call for a meeting in April, 1914, for the purpose of securing formal action on this question. But it was found impracticable, as reported by the Secretary, to get a meeting at that time, or at a later date, and the order of the Board, therefore, stands as originally issued. The Agricultural College, however, has not offered a degree course in Architecture, nor does it contemplate doing so. Upon recommendation of the President of the College, moreover, the Board of Regents of the College, at a meeting held on January 6, 1915, decided to discontinue the work in architecture as heretofore given, and after the present year to confine the work of the College in this field to Rural Architecture. It is not contemplated, however, that degrees be conferred in this work; but, rather, that it should be one of the options offered in the School of Agriculture.

*The question of defining "higher commerce" as contemplated for the University, was referred by the Board of Higher Curricula to its President, Dr. J. R. Wilson.

could be accomplished by strengthening the distinctive technical courses and making the College strong in its own field, rather than by attempting to cover a broader field with corresponding dissipation of energy and resources, and the resultant impairment of efficiency. Moreover, as the State University already occupied the field of liberal and fine arts and the professions, there appeared neither reason for, nor justification in, a duplication of the work in this field by the Agricultural College.

In line with this policy, also, as indicated in a footnote on a preceding page, instead of attempting to develop a regular degree course in Architecture, the plan is to confine the work of the College in this field to such subjects in Rural Architecture as there might be demand for in meeting the needs of the rural population. There will be regular resident instruction which may be taken as a major in the School of Agriculture, or elected by different students who are pursuing other courses.

**Rural
Architecture.**

Extension work in this field will also be emphasized. The purpose is to make this work as practical as possible, with stress upon a consideration of the relative strength, durability, and cost of building materials, and the preparation of plans and specifications. The work will include the planning of such buildings as rural churches, rural schools, farm dwellings, horse barns, dairy barns, hog barns, silos, and poultry buildings, with a study of their construction, lighting, ventilation, convenience, sanitation, plumbing, systems of water supply, and sewage disposal.

In harmony with the orders of the Board of Higher Curricula, the Board of Regents of the Agricultural College has advanced the standard of this institution, as more fully explained on a preceding page of this report, by increasing the requirements for admission to the degree courses to include the equivalent of four years' high-school work.

**Standard
Advanced.**

The degree courses of study offered by the Agricultural College under the authority of the State Board of Higher Curricula are as follows: Agriculture, Home Economics, Forestry, Logging Engineering, Mechanical Engineering, Electrical Engineering,

Mining Engineering, Highway Engineering, Irrigation Engineering, Industrial Arts, Pharmacy, and Commerce.

**College
Courses.**

The purpose of the course in Industrial Arts is to afford the preparation required for teaching manual training, referred to particularly in the paragraph on Education in the order of the Board of Higher Curricula. There is no limitation as to the grade of work offered in any of these courses except Commerce. Since "higher commerce" is assigned to the University, the Agricultural College is inhibited from offering advanced degrees in this subject. Graduate work, however, may be given as desired in Rural Sociology and in Agricultural Economics.

The rapid growth of the College during recent years, and the large increase in student enrollment, has made possible a greater division of the work in a number of the departments. This is notably true in Agriculture, but is also true to some extent in Home Economics and in other courses. This allows students greater opportunity for specialization along the particular lines in which they have interest. In Agriculture, for instance, stu-

**Opportunities
for Special
Study.**

dents may not only major in such divisions as Agronomy, Horticulture, Dairy Husbandry, Poultry Husbandry, and Animal Husbandry, but within these fields they may specialize still further in some particular subdivision. In Dairy Husbandry, for example, students may major either in dairy production or in dairy manufacture; in Agronomy—in farm crops, soils, irrigation, and drainage, farm mechanics, farm management; in Horticulture—in pomology, olericulture, landscape gardening, floriculture. They may also major in the work required in preparation for teaching agriculture. In Home Economics they may specialize in domestic science, domestic art, home administration, institutional management, applied design, education. Other options are: in Electrical Engineering—electric railways, power plants, illumination and contracting; in the School of Mines—mining engineering, ceramics, industrial chemistry; in Commerce—business administration, economics, secretarial studies.

As reported two years ago, the Board of Regents, at its meeting held on January 8, 1913, established a course in Logging Engineering, and authorized the President of the College to make application to the State Board of Higher Curricula for its approval. The details of this course were worked out by the Professor of Forestry in conference with a committee representing the Oregon branch of the Pacific Logging Congress, and the course as thus outlined was approved by the State Board of Higher Curricula at its meeting held on April 26, 1913.

Course in
Logging
Engineering
Established.

The Board of Regents, at a meeting held on July 19, 1913, established the School of Forestry and the School of Mines, the former comprising the courses in Forestry and Logging Engineering, and the latter, the courses in Mining Engineering, Ceramics, and Industrial Chemistry.

New Schools
Established.

At a meeting held on October 9, 1914, the Board of Regents also established the Bureau of Organization and Markets. The purpose of this organization is to secure harmony and greater coordination in the work of promoting farm efficiency and in assisting in the solution of the problems of distribution or marketing, by the different departments of the Extension Service, the Experiment Station, and Resident Instruction. Another purpose is to have at the College an organization with which various state organizations can cooperate in this work, such as the State Grange, Farmers' Union, Farmers' Society of Equity, etc. Dr. Hector Macpherson, Professor of Rural Economics, was elected Director. While at Washington in November, in attendance at the convention of the Association of American Agricultural Colleges and Experiment Stations, the President of the College made arrangements with the officials of the U. S. Department of Agriculture for cooperative work between the Office of Markets of that department and the Bureau of Organization and Markets of the Agricultural College. Additional information regarding the work of the Bureau will be found in the appended report of the Dean of the School of Commerce.

Bureau of
Markets.

Another important change during the biennium was the abolishment of the secondary courses in Agriculture, Home Econom-

ics, Forestry, Commerce, and Mechanic Arts, and the establishment in lieu thereof of vocational courses in general Agriculture, Dairying, Forestry, Home-making, Business, and Mechanic Arts. As shown elsewhere in this report, there had been a gradual decrease for several years in the number of students entering the College for secondary courses. This was due, no doubt, in large part, at least, to the establishment of industrial courses in the high schools. On the other hand, there has been an increasing demand for special vocational work extending through one semester, or from one to three years, according to the character of the work. It was to meet this demand that the vocational courses were organized. A more complete statement regarding the character and extent of these courses will be found in the appended reports of the deans.

There has also been a more complete organization and coordination of the winter short courses. The work of Farmers' Week, partaking rather of the character of the extension service than of regular resident instruction, has been transferred to the Extension Division and has been enlarged to include various industrial conferences.

GROWTH OF THE COLLEGE.

In the section of this report on Students, will be found information regarding the number of students registered in the different courses, indicating the increase in attendance during the biennium. It will be noted that during the past four years, the registration in the regular long courses has increased from 970 to 1,579, or 63 per cent. The enrollment of women during this period increased from 265 to 493, or 86 per cent; and the enrollment of men from 705 to 1086, or 54 per cent. There is also an increase in the enrollment during the present year over that of 1913-14 of more than five per cent, notwithstanding the advancement of the standard by adding the equivalent of one year's high-school work to the requirements for admission.

The directions in which the College is growing, the rapidity of its development, and its relative needs, are more clearly shown by reference to the work actually done in the different depart-

Vocational
Courses
Supplant Sec-
ondary Courses.

ments and to the number of students taking this work. This information is given for the two years of the biennium in the accompanying table. This table shows the increase in the number of students pursuing work in the different departments and in the number of instructional hours. Exclusive of the special work in Military Drill and in Physical Education, the average increase in all departments in the number of students was 21 per cent; in the number of instructional hours, 23 per cent. From this table it will be noted that the greatest growth has been in the School of

Increase in
Instructional
Requirements.

A comparative statement of Students and Instructional Hours for the years 1912-13 and 1913-14, is given in the table that follows. The figures given are the average for the two semesters of each year.

DEPARTMENT	1912-13		1913-14		Per cent increase	
	Stu- dents	Inst. Hours	Stu- dents	Inst. Hours	Students	Inst. Hours
Agronomy	240	62	451	104	87	67
Animal Husbandry	252	27	297	39	17	44
Dairy Husbandry	109	36	196	48	80	33
Bacteriology	162	43	179	45	10	5
Bot. and Plant Path.	367	77	468	106	27	37
Horticulture	328	70	422	112	28	60
Poultry Husbandry	36	22	25	15	31†	32†
Zoology and Entomology ..	255	57	308	94	21	65
Veterinary Medicine	21	8	53	10	153	25
Civil Engineering	141	70	197	73	39	4
Electrical Engr.	87	32	78	36	10†	12
Mech. Engr.	242	60	326	62	34	3
Exper. Engr.	54	32	70	46	29	44
Shopwork	303	147	371	178	22	21
Mining Engr.	57	45	56	67	2	49
Domestic Art*	347	103	356	115	2	11
Domestic Science*	314	68	504	104	60	53
Commerce**	707	116	937	163	32	40
Pharmacy	122	35	178	55	45	57
Forestry	79	40	108	45	36	12
Chemistry	523	133	635	143	21	7
Physics	263	73	250	60	4†	17†
Mathematics	492	98	528	109	7	11
English and Pub. Spk.	1263	129	1289	125	2	3†
Modern Language	298	50	331	58	11	16
History	134	18	100	15	25†	16†
Art and Architecture	256	65	283	93	10	43
Industrial Pedagogy	79	16	84	18	6	12
Average					21	23

*In the School of Home Economics the aggregate average increase in the number of students in all the different divisions was 30 per cent; in the number of instructional hours, 28 per cent. **Includes Political Science and Political Economy. †Decrease.

Agriculture, the increase in the number of students in the different departments of this school being 42 per cent; in the number of instructional hours, 43 per cent. In the School of Home Economics, the increase in the number of students has been 30 per cent, and in the number of instructional hours, 28 per cent; while in Commerce, the aggregate average increase in number of students in the different departments has been 32 per cent as compared with a 40 per cent increase in instructional hours. A large part of this increase in Commerce, however, is in the work taken by students who are registered in other courses, such as Home Economics, Agriculture, Forestry, Engineering.

In the School of Agriculture, 227 different courses of instruction are now given with a total of 659 semester credits. The number of students in the freshman and sophomore years has become so large that it is necessary to divide the classes into several different sections, making the work actually given equivalent to a total of 864 semester credits. The growth of this School is shown by the fact that as late as 1911-12 the number of different courses offered was 198 and the number of semester credits, 527. As further indicating the advancement of the work in Agriculture, it may be noted that the number of graduate students in Agriculture in 1911-12 was 7; in 1912-13, 14; in 1913-14, 15, while to December 21 of the present year, the number had increased to 25. Although the total enrollment during the biennium 1912-14 in the regular full-year courses in the School of Agriculture has increased over the preceding two years 71 per cent, it is significant to note that during the same period the increase in the instructional staff has been but 39 per cent.

**Growth in
Agriculture.**

The growth in the School of Forestry has also been very marked, especially considering the inadequate facilities provided for the forestry work, the total increase in the number of students for 1910-14 being 130 per cent. The average number of students in the different subjects in Forestry increased during the past two years, as indicated in the preceding table, 36 per cent; the number of instructional hours, 12 per cent.

Forestry.

In the School of Engineering, conditions are much the same as in other institutions of higher learning throughout the country. With rare exceptions, engineering schools have made little

advancement during recent years, some of them, indeed, having decreased rather than increased in student enrollment. At the College, however, during the four years, 1910 to 1914, there has been an aggregate increase of 16.5 per cent. In the amount of

Engineering. work actually given in the School of Engineering,

as shown by the number of students registered in the different subjects, and the number of instructional hours, there has been a large increase during recent years. This may be attributed largely to an increase in the number of students in other courses, as in Agriculture and Forestry, who are taking engineering subjects, and to the relative increase in the proportion of the intrants who pursue their courses to completion, thereby increasing the number of students in the junior and senior years in which most of the technical engineering subjects are taken. In Mechanical Engineering, for instance, the increase in the average number of students during the year 1913-14 over the preceding year was 34 per cent; in Experimental Engineering, 29 per cent; in Civil Engineering, 39 per cent. In Electrical Engineering, however, there was a decrease of 10 per cent in the number of students, but an increase of 12 per cent in the number of instructional hours.

Among the service departments, it will be noted that the number of students in Chemistry increased from 523 to 635. In this connection, as indicating the real growth of the College and the demands made upon it for additional room, equipment, and instructional force, it is interesting to

**Service
Departments.**

note that during the first semester of 1910-11, the total number of students in Chemistry was 314, while during the first semester of the present year the registration in the different courses of this department aggregates 764.

BUILDINGS AND IMPROVEMENTS.

With the appropriations provided for that purpose by the State legislature in 1913, new buildings have been constructed during the biennium, additional equipment purchased, and other improvements made which have added to the facilities for the

work throughout the different departments of the institution.

**New
Buildings.**

The new buildings, which are more fully described in the appended reports of the Deans, include: the Domestic Science wing of the Home Economics Building, completed at a cost of \$59,502, exclusive of equipment; two units of the Men's Gymnasium, partly completed at a cost of \$68,600, exclusive of heating; the Stock Barn, completed at a cost of \$7,064; and the Shop Storage Building, completed at a cost of \$1,604.

It will be observed that the plan adopted some years ago of constructing the larger buildings in units, as explained in the report of the President for the preceding biennium, has been continued. This has been necessary on account of the rapid increase in the demand for room. It has been impracticable, more-

**Buildings
Constructed on
the Unit Plan.**

over, to get sufficient funds at one time to complete an entire building and to provide for the other pressing needs of the institution. By this plan, however, any funds available for buildings can be used in a way to provide the room most needed and at the same time insure that the buildings, so far as constructed, shall be of permanent character, such that when entirely completed they will be adapted to the purposes for which they were planned. The Agricultural Building, for instance, was planned in three units, one unit being constructed during each of three bienniums, but when completed the three together constitute a unity admirably adapted to the needs of the departments in the School of Agriculture for which this building was provided.

Although the new Domestic Science Building is as large as could be provided with the funds available, consisting of three stories and full basement, still the work in home economics has increased to an extent such that this building even now is crowded to its capacity. By another year it will be necessary to provide class rooms for domestic science and art in other buildings, and within the next three years at most, at least one additional unit of the Home Economics Building will be required. By the removal of the domestic science and art work from the

**Domestic
Science
Building.**

Agricultural buildings, additional room was made available for the work in agriculture. The growth of the agricultural departments, particularly Agronomy, had been such that there was great need for addi-

tional room. The rooms in the Agronomy Building, formerly used by the department of Domestic Art, have been converted into an agricultural museum, a crops laboratory, and drafting rooms for rural architecture, irrigation and drainage, while the rooms vacated in the central Agricultural Building are used by the departments of Rural Economics and Political Science. The rooms in the basement of Waldo Hall, that had for a number of years been used by the department of Domestic Science, were remodeled for the work in applied design and for the use of the women in the dormitory.

The Men's Gymnasium is planned in four units. At the time the President's report was published two years ago, it was estimated from the preliminary sketches of the architects that this building would cost from \$75,000 to \$80,000. The cost was greater than it otherwise would be on account of the necessity of using the Gymnasium as a College auditorium and for other general instructional purposes. With more than a thousand men in attendance, and the College growing rapidly, it was apparent that it would be unwise to plan any building for gymnasium work that when completed would accommodate fewer than 2,000 men. With

**Men's
Gymnasium.**

no auditorium available at the College also, it would be necessary to use the main floor of this building for College assemblies; and, to meet these requirements, this room should be large enough to accommodate from 2,000 to 2,500 people. It was deemed impracticable to secure an appropriation at that time sufficient to complete a gymnasium building of the size required and at the same time meet the other needs of the institution for maintenance, additional room, equipment, improvements, etc. The congestion was such, however, in the old gymnasium, then used for both men and women, that it was imperative that some relief be secured. A request was made, therefore, for an appropriation of \$40,000 to \$50,000 with which partly to complete the central unit. \$40,000 was appropriated with the expectation that the central unit could be sufficiently completed for temporary use, and that additions would be made as funds for that purpose could be provided. When the architect's plans were complete, however, and the contractors' bids received, it was found that, on account of the large size of the central unit, it would be impracticable to complete

even this part of the building to the extent contemplated within the amount of the appropriation available at that time. It was found advantageous, moreover, and necessary, to provide bathing and other facilities in another unit. As the mill tax law would go into effect on January 1, 1915, and the income therefrom was to be used for buildings and other improvements, as well as for maintenance, the Regents planned to have the construction of this building extend over a period of three rather than two years, and to supplement the special appropriation by the necessary additional amount to be saved for building purposes from the millage tax income. This was the only way, indeed, in which the situation could be met without reducing the building in size in a way such that it would not meet the requirements of the institution. Satisfactory arrangements being made with the contractors, therefore, the building was constructed accordingly, with provision for final payment from this year's income.

Among the more important items of improvement and equipment are the following: the drainage of one unit of the College farm at a cost of \$1,726; the extension of water mains, campus drainage, and other improvements, \$6,642; the construction and improvement of walks and drives, \$9,734; the construction of an eighteen-inch sewer from the trunk line through the center of the campus to a point west of the Administration Building, with laterals to different buildings, \$2,811; the remodeling of Science Hall for the departments of Pharmacy and Chemistry, with additional equipment, \$15,721; the remodeling and furnishing of the old Gymnasium for the use of women, \$1,870; the equipment of the new Men's Gymnasium, \$3,083; the extension of the heating plant, including the construction of an additional unit to the

Other
Important
Improvements.

building, the installation of an additional boiler, the enlargement of the main through the old tunnel, the construction of a new tunnel to Waldo Hall and the Men's Gymnasium and the new Domestic Science building, and other miscellaneous improvements, \$18,837; the remodeling and furnishing of Cauthorn Hall, converting this building from a men's to a women's dormitory, \$6,687; constructing colony houses, breeding coops and fences, and remodeling and furnishing the old wooden horticultural building for the Poultry department, \$3,400; the installation of cold storage plants

in the Dairy and Horticultural buildings, \$4,225; the purchase of pure-bred live stock for the Dairy and Animal Husbandry departments, \$9,777; the equipment of the Experimental Engineering laboratory, \$5,392; the equipment of the new School of Mines Building, including geological museum, ore-dressing and ceramics laboratories, \$6,833; the equipment and furnishing of the new Domestic Science Building, including plumbing, electric fixtures, desks and furniture, miscellaneous equipment, and the installation of a gas machine, \$13,120.

As explained in different biennial reports, the College has had difficulty in securing at reasonable prices different tracts of land required for College buildings. After negotiations extending over a number of years, the last of these tracts, four in number, containing about eight acres, were finally purchased during 1913, at a total cost of \$14,831. During the biennium final payment was also made on the South Farm, amounting to \$10,257.50; also the claim for \$7,345, on the Horticultural, Dairy, and Farm Mechanics buildings, awarded by arbitrators, in a case contested by the J. C. Winters & Company, contractors.

Land
Purchased.

AGRICULTURAL EXPERIMENT STATION.

In the appended report of the Director and the separate reports of the branch stations and of the Crop Pest and Horticultural Investigations, the work of the Experiment Station during the past two years is fully described. For details concerning this work, reference must be made to these reports.

The most important change during the biennium in the organization of the Experiment Station was the withdrawal of Dr. James Withycombe as Director. Dr. Withycombe submitted his resignation on February 21, 1914, to take effect March 31, 1914. He had been in the service of the College for sixteen years, having come to the institution in 1898, as Vice-Director and Agriculturist of the Experiment Station. In this position, however, he had immediate supervision of the Station work, although the President of the College at that time was also Director of the Experiment Station. In 1901

the Board of Regents segregated the offices of President and Director, and Dr. Withycombe was made Director. He also occupied the position of Professor of Agriculture, and had general charge of the instructional work in agriculture, as well as of research and investigation. In 1908, however, there having been established a number of different professorships in agriculture, with a large increase in student enrollment, the agricultural research and instructional work was segregated, and the departments for resident instruction were organized into a School of Agriculture with a separate dean. This made it possible for the Director to concentrate his efforts upon the work of the Experiment Station.

Director
Withycombe
Resigns.

During the sixteen years of Dr. Withycombe's administration, the Station work was characterized by rapid growth and efficient service. The development of the Station during these years is indicated by the fact that in 1898 there were five departments, with a staff consisting of ten members and an annual income of \$15,900, including the Federal appropriation of \$15,000 and the receipts from sales of farm products; while at the present time there are nine different departments at the home station, and seven branch stations maintained in different sections of the State, with a staff of 45 and an annual income from all sources of more than \$104,000. In addition, a large number of experimental and demonstration plots are maintained cooperatively with farmers and fruit-growers.

Development of
Station.

From the beginning of his administration, Dr. Withycombe placed special emphasis upon the importance of making the Station work of the greatest possible immediate practical value. It was his policy in the development of the Station to utilize the available resources for the investigation of problems peculiar to Oregon, leaving the larger problems of general application to the more wealthy stations of other states. He recognized that the problems confronted by the farmer and orchardist varied widely in different sections of the State, according to soil and climatic conditions, and as early as 1899 a tract of land was leased in a typical section of Eastern Oregon for the purpose of carrying on work adapted to the conditions in that region. It was in pursuance of this policy of adapting the work of the Station to the varying needs of the State that permanent branch stations were later

Work Adapted
to State Needs.

established, from time to time, as conditions warranted and funds were available.

Throughout the entire period of his administration, Dr. Withycombe has been an enthusiastic advocate of the importance of applying scientific principles in agriculture, and of following the most up-to-date methods in the improvement of the farm and the farm home. He has wielded a potent influence in breaking down prejudice against so-called book farming, and in inspiring confidence among the people in the value of agricultural education and the work of the Experiment Station. He has emphasized the fundamental importance of diversified agriculture, the restoration and conservation of soil fertility, the rotation of farm crops, and particularly of the dairy and livestock industry in the establishment of a permanent and successful agriculture.

Diversified
Agriculture
Advocated.

Through the farmers' institutes Dr. Withycombe has been brought into touch each year with many thousands of people throughout the State; and by his optimistic, devoted, and efficient service, has led in the movement for improving the conditions of rural life in this State. In leaving the Station, he carries with him the cordial good will of the entire College community.

Upon the resignation of Dr. Withycombe, Dean A. B. Cordley, of the School of Agriculture, was elected Director, the Board of Regents having decided to combine the offices of Dean and Director, thereby centering in one official the administration of both research and resident instructional work. There has

Dean Cordley
Made Director.

been no particular change, however, in the general policy of the Station. The different projects have been continued on much the same basis as reported for the preceding biennium, with such changes only as may have been required by the completion of certain work or by its adaptation to changed conditions.

The Experiment Station comprises what is known as the home Station at the College and seven branch stations. The work of the home Station includes different projects provided for by the Federal Government under the Hatch and Adams Acts, and also serves as the center from which the special work is done under the State law providing appropriations for miscellaneous agricultural research

work and for crop and fruit pest and horticultural investigations.

What the Station
Comprises.

At this station also are centered the different scientific laboratories, with the necessary facilities for the extensive analyses and determinations required in most of the work at the different stations and elsewhere throughout the State. The branch stations include the Eastern Oregon Station at Union, the Umatilla Station at Hermiston, the Dry-Farm Stations at Moro, Sherman County, and Burns, Harney County, the Southern Oregon Station at Talent, Jackson County, the John Jacob Astor Station near Astoria, Clatsop County, and the Hood River Station in Hood River County.

With the home Station at Corvallis and the branch stations, the agricultural research work is now organized and distributed over the State in a way such as to make it of the greatest possible value. Altogether, these stations represent eight different distinctive agricultural regions of the State. The home Station, for instance, while doing the work in such subjects as bacteriology, plant pathology, and agricultural chemistry, that may have equal value in different sections, regardless of climatic or other conditions, represents in its local special work, particularly in the field, the agriculture typical of the Willamette Valley. The work of the Union Station is adapted to the particular needs of the large territory in Eastern Oregon in which livestock, the cereals, and forage crops constitute the principal agricultural interests. Likewise, the station on the Umatilla project is devoted primarily to the work of subduing the soils and solving the irrigation, horticultural, and other problems peculiar to the district in which it is located.

Station Work
Specialized.

The dry-farm stations at Moro and Burns are chiefly concerned with questions involved in successful dry-land farming in the semi-arid regions of Central Oregon. While in certain respects the dry-land investigations have to do with the same general problems, the differences in altitude, annual precipitation and other conditions peculiar to the two sections, give to each of these stations its special field with its own peculiar problems. The Southern Oregon Station at Talent, on the other hand, represents in its work conditions typical of the Rogue River Valley, and is concerned largely with the investigation of problems encountered in the development of the fruit industry of that section. In the Hood River Valley, again, though fruit is the principal product, conditions are quite different in many respects from those obtaining in the Rogue

River Valley and the other districts mentioned, and in order to solve the problems peculiar to that section the Hood River Station is maintained. Then, there is the branch station in Clatsop County, representing conditions typical of the coast country, in which dairying is the chief agricultural industry.

While each of the stations is devoted to the particular work of the greatest importance in the region represented, the results obtained are utilized elsewhere to the extent that they may be found of value. The work of all the stations, moreover, is planned so as to avoid all unnecessary duplication, thereby making possible the best use of the available funds in obtaining results in the aggregate of the greatest value to the entire State. In addition to the strictly research and investigational work, very valuable results are also being obtained from cooperative experimental and demonstration work with the farmers and orchardists. The work of the Experiment Station throughout all its departments is thoroughly organized and is of undoubted and far-reaching value. There are many experiments, indeed, as shown in the reports mentioned above, any one of which exceeds in value each year many times the entire cost of the experimental work.

Although great improvement has been made during the biennium in the facilities provided for station work, there are still urgent needs that cannot be met from the present income. The Federal appropriation under the Adams Act is not available either for administrative work or for the publication of results obtained, but must be used for strictly investigational work, and the funds received under the Hatch Act are also narrowly limited in their application. The demands upon the Station also for expert assistance throughout the State are increasing at such rate that it is impracticable fully to meet these demands from the State appropriations provided for agricultural research and investigation.

As Director Withycombe says: "One of the most pressing needs of the Station at this time is a fund for Station publications. There is a great deal of valuable accumulated experimental data that should be in the hands of farmers, but the funds of the Station available for such purposes are not adequate to publish this information." It is of great importance that as the work progresses the results obtained be published and distributed for the use of the farmers. As urged by the

Value of Experiment Station Work.

Restriction of Funds.

Publication Fund Required.

Director, there should be provided a special publication fund. Since no other funds are available for this purpose, an annual appropriation of some four or five thousand dollars should be secured for Station publications. This would relieve somewhat other Station funds, now used for publications but badly needed for other purposes, and would greatly enhance the value of the Station work.

There is still great need for additional land. Through the purchase of the south farm, provision was made for the poultry-breeding plant, for the experimental and instructional orchards, and for certain work also in animal husbandry. Notwithstanding this, however, it is necessary to lease between three and four hundred acres of land in providing for the maintenance of the flocks and herds and for the experimental and demonstration work. While the rental does not exceed the interest value of the land, perhaps, still it is of the utmost importance that the necessary lands be purchased as soon as practicable, in order that the farms may be properly improved and the work planned on a permanent basis.

Land and Build-
ings Needed.

As explained elsewhere in this report, there is also great need for additional room. Among the buildings most needed at the present time in the agricultural work are the sheep barn, the hog barn, the veterinary laboratory, and the feed and seed storage building, with the necessary equipment and miscellaneous improvements required in connection therewith. These will be provided as rapidly as possible from the millage-tax income.

COLLEGE EXTENSION.

In his biennial report for 1907-08, the President of the College discussed the development of agricultural extension work in the land-grant colleges throughout the United States, and emphasized the importance of the Oregon State Agricultural College's enlarging its activities in this field. In his report for 1909-10 the subject was given further consideration. It was urged that in order properly to develop this phase of College service there should be organized an extension division coordinate in rank with the Experiment Station and the departments of resident instruction. No funds for this

Development of
Extension Work
in Oregon.

work, however, were available, except an appropriation of \$2,500 a year for farmers' institutes. This, of course, was entirely inadequate, not being sufficient even for the traveling expenses of the members of the faculty

and Experiment Station staff who conducted institute work incidental to their regular duties. A special appropriation of \$5,000 a year was therefore requested from the State legislature. But at that time the members of the legislature were not convinced of the importance of the extension work and no appropriation was provided.

Again, in 1913, in his report for the preceding biennium, the President of the College explained the great advancement that had been made in different states in organizing and developing various agencies for extension service. He emphasized the absolute necessity without further delay of making adequate provision for this work in Oregon. The following in regard to the importance of the work is taken from that report:

"Probably the greatest pressing demand to which the College is not prepared to respond is for demonstration and other forms of extension work. Notwithstanding the remarkable growth of resident work, the demand for trained men in scientific agriculture, for instructional and research positions in agricultural colleges and experiment stations, as instructors in high schools, and as superintendents or managers of large orchards and farm properties, is far in excess of the number of people qualified for these various positions. As such demands increase and become more persistent, the agricultural courses at the College will attract correspondingly larger numbers of the more capable and ambitious students. But with the development in agricultural education of collegiate grade has come, during the later years, a great awakening among the people to the importance of disseminating up-to-date knowledge in usable form directly among the farm population. Whatever be the achievements in the discovery of new scientific truths, or their value as applied in agriculture, or to whatever extent the relatively few who are able to enjoy the advantages of college training may master the basic principles upon which rests a stable and successful agriculture, the great problems confronted in the general betterment of rural life conditions can be solved only in the open country, out on the farms and in the homes of the people who are in daily contact with these problems. Hence the demand, now nation-wide, for extension work." (Page LXI.)

During the year 1912 negotiations had been taken up with the officials of the United States Department of Agriculture regarding cooperative extension work by the Department with the Agricultural College in this State. Tentative arrangements had been made for such cooperation in dairying and farm management, contingent, however, upon securing the necessary legislation from the Oregon legislature. It was strongly urged, therefore, that the required legislation be secured at once, and that such legislation should be sufficiently comprehensive to make it possible to utilize every available resource in promoting the development of this important work. Accord-

Importance of
Extension Work.

Cooperative
Work Planned.

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ingly, at the session of the State legislature in 1913, a measure was introduced providing for the extension service as recommended by the Agricultural College. This measure was strongly supported by different organizations throughout the State, and was finally passed by practically a unanimous vote.

Under this act, which is fully explained in the appended report of the Director (page 42), the State makes a direct appropriation for the general support of extension, and, within certain limitations, duplicates county appropriations for county agricultural work and appropriations by the Federal Government for co-operative extension work in Oregon. This law was regarded at the time as probably the best and most comprehensive of the kind in the United States, providing as it does for cooperation in extension work between the College, the State Department of Education, the different counties, and the Federal Government. This act, in part, anticipated certain congressional legislation, thereby placing Oregon in a position to utilize any possible assistance that might come from the Federal Government for extension work.

Oregon Ex-
tension Law.

The extension legislation was completed in 1914, as explained elsewhere in this report (page VII), upon the passage by Congress of an act providing appropriations to the several states for co-operative extension work in agriculture and home economics. This act is administered on the part of the Government by the Department of Agriculture. In furtherance of the plan provided for in the State and Federal laws, the Secretary of Agriculture and the President of the Oregon State Agricultural College signed a memorandum of agreement on August 3, 1914, in which occurs the following:

Cooperative
Agreement.

"The United States Department of Agriculture agrees:

(b) To conduct in cooperation with the Oregon State Agricultural College all demonstration and other forms of extension work in agriculture and home economics which the Department is authorized by Congress to conduct in the State of Oregon."

This agreement is of great importance, as it insures complete cooperation between the Government and the College in all extension activities in the State of Oregon.

The Extension Division of the College had been organized in November, 1911. During the intervening years the extension work had been developed to the extent possible with the funds available, through members of the faculty and Experiment Station staff who

devoted as much time to this work as could be spared from their regular duties. At the time of the passage of the State Extension Law, therefore, and the Smith-Lever Act of Congress, the College was in a position to enter at once upon the larger field of extension service. Although the farmers' institutes that had been inaugurated some twenty years before were continued to the extent thought advantageous, greater emphasis in the new plan was placed upon the work of the county agriculturists, the itinerant schools, the boys' and girls' industrial clubs, and upon farm management, marketing, and organization.

**New Extension
Projects.**

A summarized statement from the Director's report shows that during the biennium, though the Smith-Lever Act had been in force only six months, and the extension act of the State legislature about a year and a half, more than two hundred thousand people in the State had been reached by different forms of the College extension service. Of these, 5,290 had attended Chautauqua lectures; 41,976, farmers' institutes; 56,454, special institutes and lectures; 5,547, teachers' institutes; 16,268, movable schools and itinerant short courses; and 11,850, special demonstrations and lectures; while more than 12,000 boys and girls had been enrolled in the industrial club work, and some 75,000 had participated in the preparation of industrial exhibits for school fairs. In addition, besides many thousands of personal letters written by members of the College staff, 72 bulletins were published by 29 different members of the College faculty, numbering 341,900 copies, with an aggregate of 6,087,260 pages.

**Extension
Statistics.**

The Extension staff numbers 44, of whom 28 give their entire time to the extension service, and 16 divide their time between extension work and resident instruction or agricultural research. In addition, other members of the faculty, though receiving their salaries from other funds, devote more or less time to extension work incidental to their regular duties.

A more complete statement of the plan of organization and the extent and character of the extension work, with an outline of the different projects, will be found in the appended report of Director Hetzel.

COLLEGE FINANCES

In the appended report of the College Treasurer will be found in detail an account of the receipts and expenditures during the biennium. For resident instruction and the home Experiment Station the report is for the two years, July 1, 1912, to June 30, 1914; and for the branch experiment stations, the crop pest and scientific investigational funds and the extension service, for the calendar years 1913 and 1914. These reports include all funds from whatever source obtained, although under an act of the State legislature passed in 1913, the College Treasurer is responsible for only the Federal appropriations and certain special funds.

The work of the Agricultural College is organized into three main divisions, each of which, as explained on a preceding page (VII), is financed entirely independently of the other two, except that appropriations for buildings, land, and equipment are used in providing the necessary facilities for the work of the entire institution. These divisions include the regular resident instructional work in course at the institution, the agricultural experimental and research work, and the extension service. Separate reports, therefore, of the receipts and expenditures are submitted for each of these divisions. From these reports it will be seen that there are four principal sources of income.

I. The Federal Government:

1. Land Grant Act of 1862, for instructional purposes.
2. Morrill Act of 1890, for instructional purposes.
3. Hatch Act of 1887, for agricultural experimental work.
4. Adams Act of 1906, for agricultural experimental work.
5. Nelson Amendment of 1907 to the Morrill Act of 1890, for instructional purposes.
6. Smith-Lever Act of 1914, for extension work in agriculture and home economics.
7. Department of Agriculture for cooperative experimental work in agriculture.
8. Department of Agriculture for cooperative extension work in agriculture and home economics.

*II. The Oregon State Legislature.**III. Oregon Counties.**IV. Student Fees, Miscellaneous Sales, Etc.*

Segregated, the amounts received for the year 1914 from the different sources indicated are as follows:

I. *From the United States Government:*

1. <i>For instructional purposes, annually—</i>			
Act of 1862—Interest on Land-Grant fund,			
approximately	\$11,000		
Act of 1890	25,000		
Act of 1907.....	25,000		\$ 61,000
<hr/>			
2. <i>For experimental purposes, annually—</i>			
Act of 1887.....	\$15,000		
Act of 1906.....	15,000		
Department of Agriculture—			
Dry-farming stations in Harney and			
Sherman counties.....	4,600		
Irrigation station on Umatilla Irrigation			
Project at Hermiston	3,000		\$ 37,600
<hr/>			
3. <i>For extension work, annually—</i>			
Smith-Lever Act	\$10,000		
U. S. Department of Agriculture—			
Farm management	\$3,440		
Dairy demonstrations	2,500		
Industrial clubs	900		
Farm surveys	500		
Hog-cholera demonstrations	150	7,490	\$ 17,490
<hr/>			

II. *From the Oregon State Legislature:*

1. <i>For resident instructional purposes, annually—</i>			
*Section 4260, Lord's Oregon Laws.....	\$80,000		
*Chapter 90, General Laws for 1911.....	70,000		
*Chapter 210, General Laws for 1913.....	50,000		\$200,000
<hr/>			
2. <i>For experimental purposes, annually—</i>			
(a) Home Station—			
For crop and fruit pests and			
horticultural problems, an-			
nually	\$15,000		
For other agricultural investi-			
gations	10,000	\$25,000	
<hr/>			
(b) Branch Stations—			
Eastern Oregon, at Union.....	7,500		
Umatilla, at Hermiston.....	3,000		
Sherman County, at Moro.....	2,500		
Harney County, at Burns.....	4,000		
Southern Oregon, at Talent.....	5,000		
Clatsop County, at Astoria.....	3,000		
Hood River County, at Hood			
River, for 1913 and 1914....	3,000	\$28,000	\$ 53,000
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3. <i>For extension service, annually—</i>			
Farmers' institutes	\$ 2,500		
Educational extension	25,000		
Cooperation with U. S. Department of Agriculture—			
Farm management	\$ 3,440		
Dairy demonstrations	2,500		
Industrial clubs	900		
Farm survey work.....	500		
Hog-cholera control	150	7,490	
<hr/>			
Cooperation Oregon counties—			
Coos County	\$ 1,500		
Crook County	1,500		
Harney County	2,000		
Jackson County	2,000		
Klamath County	1,500		
Lane County	1,500		
Marion County	1,500		
Malheur County	1,500		
Tillamook County	1,500		
Union County	1,500	*16,000	\$ 50,990
<hr/>			
4. <i>For buildings, improvements, repairs, library books and periodicals, purchase of land, equipment, etc., for institutional use—instruction, research, extension, —for two years, Chapters 209-211, General Laws for 1913, \$249,000; for year 1914.....</i>			
			\$124,500

III. *From Oregon Counties, annually:*

1. <i>For maintenance of county agriculturists in dupli- cation of state appropriation—</i>			
Coos County	\$1,500		
Crook County	1,500		
Harney County	2,000		
Jackson County	2,000		
Klamath County	1,500		
Lane County	1,500		
Marion County	1,500		
Malheur County	1,500		
Tillamook County	1,500		
Union County	1,500	\$16,000*	
<hr/>			
2. <i>For Experiment Station at Hood River—</i>			
Hood River County		2,000**	

*This is the total of the annual rate of the county appropriations. In some cases the work was not inaugurated until late in the year, and the actual receipts would therefore be less than the amount here given.

**The state appropriation for experimental work in Hood River County is \$3,000 for each of the years 1913 and 1914, with the stipulation that the county appropriate \$2,000.

IV. *From Miscellaneous Sources:*

1. *For resident instructional purposes, annually—*
From student fees and departmental sales.....\$10,104*
2. *For experimental purposes, annually—*
From sales of farm products, approximately—
 (a) Home Station\$ 7,653
 (b) Branch Stations 12,745 20,398**

The distribution of the income for 1914 for Resident Instruction, the Experiment Station, and the Extension Service is as follows:

- I. *For instructional purposes—*
 1. From U. S. Government.....\$ 61,000
 2. From Oregon State Legislature..... 200,000
 3. From miscellaneous sources, approximately.... 10,104 \$271,104
- II. *For experimental purposes—*
 1. From U. S. Government\$ 37,600
 2. From Oregon State Legislature..... 53,000
 3. From Oregon Counties 2,000
 4. From miscellaneous sources—
 Home Station, approximately.....\$ 7,653
 Branch stations, approximately.... 12,745 \$ 20,398 \$112,998
- III. *For extension work—*
 1. From U. S. Government\$ 17,490
 2. From Oregon State Legislature..... 50,990
 3. From county appropriations 16,000 †\$ 84,480
- IV. *For buildings, improvements, land, equipment—*
 1. From Oregon State Legislature (See ¶4, page XLII).... \$124,500

*Student laboratory fees and deposits amounted during the year in the aggregate to \$17,760.55. These, however, are used for the purchase of student supplies required in laboratory, shop, and other work, and are, therefore, not included in the report of income for College support.

The receipts from farm sales also amounted during the year to \$7,525.20. These consisted largely merely of a transfer from one department to another, as in the case of feed grown under the direction of the Department of Agronomy and used for the maintenance of livestock in the Department of Animal Husbandry. Animals may be bought also for special purposes, as during the farmers' week of the winter short course, and paid for from the receipts of sales at the close of the period for which the animals are purchased; also receipts from dairy products are used for the purchase of milk and cream required in the manufacture of butter and cheese. Although these different items are of record, the same as other receipts and expenditures, and are handled under the same regulations, they are omitted here as in the case of student laboratory and incidental fees, as they do not constitute an available resource for the support of the institution.

**These include only receipts from the regular departmental sales, but do not include mere transfers from one department to another.

†See note, page XLII.

Reference has already been made in this report (page VI) to the necessity of having a permanent income for institutions of higher learning, and to the provisions that have been made by the State legislature for the financial support of the Oregon State Agricultural College.

The relative merits of different methods of financing educational institutions were discussed at considerable length in the biennial report for 1910-12. The value of an annual statutory levy was explained; also the uncertainty of this method, particularly in the newer states where the conditions are more or less unsettled and there is lack of a definite policy in evaluating state property for taxation. It was shown that in some states the assessed valuation of state property had varied as much as 50 per cent in a single year, while for the same period the variation in student enrollment in the institutions of higher learning had been only 25 per cent. In some cases, while there had been large increase in the tax levy, there had been an actual decrease in the number of students. Generally, however, the increase in student enrollment had been in excess of the increase in state valuation.

The Oregon State Tax Commission had estimated that the future increase in this state in the valuation of taxable property should be about four per cent each year. As pointed out at that time, however, the average increase during recent years in the number of full-year students at the State Agricultural College had been about 17 per cent. It was urged, therefore, that great care should be exercised in any attempt that might be made in Oregon to provide for the permanent financial support of the higher educational institutions.

That there was justification in this warning is shown by the development of the past two years. In 1913, at the time of the passage of the millage-tax laws providing for the support of the State University and the State Agricultural College, the State Tax Commission estimated that the tax valuation of state property for Oregon for 1914 would be one billion dollars, an increase of forty-six million dollars over the preceding year. As a matter of fact, however, there was an actual decrease from \$954,000,000 in 1913, to \$932,000,000 in 1914. The result is a reduction in the income of the Agricultural College below what was estimated for resident instruction for the

Disadvantages of
Millage Tax.

Reduction in
College Income.

year 1915 by more than \$27,000. The indications are, moreover, that there will be a further decrease in 1915, with a corresponding additional reduction in the College income for 1916.

In the report submitted to the Secretary of State under date of December 10, the estimated income for 1915 was based upon the assumption that the entire levy for 1915 would be available for that year. It has since developed, however, that while the levy was

Change in
Fiscal Year.

made for 1915, only three-fourths of it will be available for the year 1915, covering the period from April 1 to December 31, the remaining fourth having to be carried over for the period January 1 to April 1, 1916, when the first payment for 1916 becomes due. The income under this law, therefore, while levied for the calendar year, will be available for the period April 1 of one year to March 31 of the following year. The effect of this upon the Agricultural College finances, in connection with the reduction in valuation of state property, is to reduce the net income for the calendar year 1915 below the amounts estimated at the time of the passage of the mill-tax law in 1913 by more than \$120,000.

It has been determined by the Board of Regents, however, that the expenditures shall be kept within the income. This can be accomplished only by suspending for the time being all building and improvement operations. The necessity for this

No Special Approp-
riation Requested.

is most unfortunate. There is urgent need for additional room, and many improvements also should be made without delay in properly caring for College property and providing for the work of different departments. In spite of these conditions, however, no special appropriation will be requested from the State legislature with which to meet this emergency. The most possible will be made of the situation, and the funds available used to the best advantage in meeting the requirements of the institution.

The following statement shows the income from the State for resident instruction, including buildings and improvements, for the years 1913 and 1914, and the estimated income for the years 1915 and 1916:

	1913	1914	1915	1916
1. <i>Continuing Appropriations for Current Expenses—</i>				
*Sec. 4260, Lord's Oregon Laws..\$	80,000	\$ 80,000	\$ 20,000**	.....
*Chap. 90, General Laws 1911.....	70,000	70,000	17,500**	.....
*Chap. 210, General Laws 1913....	50,000	50,000	12,500**	.....
2. <i>Special Appropriations—</i>				
Improvements and repairs, extension of heating system, remodeling of Science Hall, library books and periodicals, as provided in Chapter 209, General Laws for 1913***....	41,000	41,000	.....	.....
Buildings, as provided in Chapter 211, General Laws for 1913***....	53,500	53,500	.....	.....
Equipment as provided in Chapter 217, General Laws for 1913***....	30,000	30,000	.....	.....
3. <i>Millage Tax—</i>				
Chapter 136, General Laws for 1913. For current expenses, or general maintenance, buildings, improvements and repairs, equipment, library books, land, etc. ....	.....	.....	279,600†	372,800†
Total	\$324,500	\$324,500	\$329,600	\$372,800

From the above it will be observed that the income for 1915 will be practically the same as for each of the preceding two years, notwithstanding the large increase in student enrollment and the necessity occasioned thereby for additional instructors and other facilities required in providing for efficient work. The increase in regular matriculates, or full-year students, in 1913 over 1912 was more than 18 per cent; in 1914 over 1913, 15 per cent. There no doubt will be a substantial increase in student enrollment during the next biennium, though on account of the advancement in the standard, the rate of increase may not be so great as during the preceding two years.

In this connection a statement showing the relative growth in income and student enrollment during recent years is significant. A table compiled from the reports of the Registrar and the Business Office shows that while the increase in income for 1912 over 1911 for resident instruction, including special appropriations for buildings and other improvement, was 14 per cent, the increase in student enrollment was 18

*These laws were repealed in Chapter 136, General Laws for 1913, to take effect April 1, 1915.

**One-fourth annual appropriation, January 1 to March 31, 1915.

***These appropriations were for the biennium. For convenience they are divided equally between the two years.

†This appropriation becomes available when taxes are collected in April, 1915. The estimate is on the basis of a state valuation of \$932,000,000.

per cent. For 1913 over 1912, the increase in income was 5 per cent; in student enrollment, 18 per cent. Finally, for 1914 over 1913 the increase in income was only 7/10 of one per cent, while the increase in student enrollment was more than 15 per cent.*

In the table on the preceding page giving the comparative income from the State for each of the years 1913 and 1914 and the estimated income for 1915 and 1916, it will be observed that the income for each of the first two years is the same, with an increase of \$5,100 for 1915. These totals, however, are given for the calendar year, whereas College budgets must, of necessity, be made for the school year, July 1 to June 30. As a matter of fact, the total income for resident instruction for the school year 1914-15 is 21 per cent LESS than the income for the preceding year.**

With an enrollment such as the College now has, the cost per student from year to year remains essentially the same. As the number of students increases, if the standard of efficiency be maintained, there must be corresponding increase in income for instructors, room, and other facilities. As indicated above, the increase in enrollment during recent years has been relatively far greater than the increase in income. It is obvious, therefore, that in caring properly for the work of 1915 and 1916, there must be a large increase in the instructional force and in other items of maintenance. Not only is it necessary that the College staff be increased, but there must also be some increase in the salaries of present employees. No general increase in salary is contemplated, but conditions are such that in order to maintain the present efficient organization, and prevent the loss to other institutions of a number of the faculty occupying important and responsible positions, some increase in salary cannot be avoided.

In preparing the budget for the next biennium the estimates of the various heads of departments have been reduced to a minimum. In the outline herewith submitted, details of which may be found in the Appendices, pages 116-120, an allowance of 11 per cent of the salary budget for 1914 is made for additional instructors, and

*Regular full-year students only are included, no account being taken of attendance at summer school and the winter short courses.

**The income from all sources for resident instruction for the year 1913-14 was \$394,500, while the income for 1914-15 is \$312,500. The latter amount includes \$150,000 continuing appropriation for the nine months, July 1, 1914, to March 31, 1915, and \$93,000, the income under the millage-tax law for the three months, April 1 to June 30, 1915. The balance of the income is from the Federal Government and miscellaneous receipts.

XLVIII OREGON AGRICULTURAL COLLEGE

about five per cent for increase in present salaries. There is also the required allowance for increase in general maintenance, including care of buildings, heating, light and power, etc. In each case the increase is the minimum consistent with efficient service. From these estimates it is apparent that for 1915, at least, the maintenance requirements will be such as to preclude the possibility of any building operations during this year. Indeed, further arbitrary reductions will need to be made in the amounts allowed for repairs, improvements, and equipment, aggregating some \$10,000, in order that the estimated expenditures may be brought within the income, with a proper allowance for contingent expenses.

The following is the estimated income for 1915 from all sources for resident instruction, including salaries, care and heating of buildings, light and power, publications, repairs, equipment, library books and periodicals, land, and permanent improvements, such as new buildings, construction of drives, walks, etc.:

Continuing appropriation, January 1 to March 30, 1915.....	\$ 50,000	
Millage tax, April 1 to December 31.....	279,600	
Morrill fund	50,000	
Land-grant interest	11,500	
Miscellaneous, including student entrance fees but excluding shop and laboratory fees and receipts from sale of farm products*	10,000	\$401,100

The estimated requirements for 1915, based upon the actual expenditures for the preceding year, are as follows:

1. <i>Salaries</i> —		
On basis of 1914**.....	\$236,243	
Estimated additional salaries, 1915.....	27,570	
Increase in present salaries (5%).....	12,750	\$276,563
2. <i>General Maintenance</i> —		
Including salaries, care of buildings, heating, light, power, water, publications, etc., but excluding shop and class student supplies***		69,100
3. <i>Repairs</i> —		
Including necessary repairs to buildings, painting, refinishing floors, repairing plastering, refitting doors and windows, repairing roofs, down-spouts, etc.		9,353
4. <i>Improvements</i> —		
Including walks, drives, equipment for fire protection, etc.....		9,840

*See note, page XLIII.

**This does not include salaries of employees on the College farms, as these are covered by receipts from farm sales, nor of those in the service departments given under "General Maintenance."

***The cost of supplies required in laboratory, shop, and other departmental work is not included here for the reason that these supplies are paid for from student fees not included in the statement of estimated income.

5. <i>Library—</i>	
Including library books and periodicals	7,500
6. <i>Equipment—</i>	
Departmental equipment, including scientific apparatus, live-stock, machinery, desks, cases, etc.	30,000
	<hr/>
	\$402,356

The estimated income for the year 1916 aggregates \$445,300 as follows: Millage tax \$372,800, Federal Government \$50,000, land-grant interest \$11,500, miscellaneous \$11,000.

Exclusive of buildings, the expenditures for the year 1916, on the basis of 1915, as summarized above and given more in detail in the Appendices, would amount, in round numbers, to \$426,000.

This allows between three and four thousand dollars for increase in miscellaneous items of expense and \$19,900 for additional instructors, including about three per cent for increase in salaries. The amounts included for repairs, improvements, equipment, and library books and periodicals are the same as for 1915. On this basis there would be a balance of approximately \$19,000 for new buildings.

The need for additional room is such, however, particularly in view of the fact that no money will be available for new buildings in 1915, that it would seem imperative that the original budget for the biennium be so readjusted as to secure a larger amount for buildings in 1916. Since the miscellaneous items of maintenance expense cannot be reduced, and the allowance for instructors is the minimum consistent with efficient work, the only way this can be accomplished is by reducing the amounts originally allowed for improvements, repairs, library books, and equipment. These latter are all as low as they should

**Income
for 1916.**

**Building Fund
Increased.**

be, but the relatively greater demand for room would seem to justify the change. By omitting all permanent improvements and including only such repairs as are necessary in keeping up College property, and allowing only for incidental items of equipment and the amounts required for periodicals for the library and for necessary binding, these items could be reduced from the amounts given to the following: Improvements and repairs \$7,000, Library \$5,000, equipment \$12,000. In this way the amount available for buildings during the year 1916 could be increased to approximately \$52,000.

In this connection emphasis should be placed upon the fact that, notwithstanding the construction of new buildings during recent

years, the growth of the College has been such that, with the corresponding increase in the requirements for maintenance, it will be impossible, depending upon the income from the millage tax, to provide room as rapidly as necessary in caring properly for the work of the institution.

The work in forestry and logging engineering is crowded into two small classrooms and an office in Science Hall. These rooms are entirely inadequate and unsuitable. In fact, at the time the State legislature convened in 1913, the enrollment in forestry had grown to a point such that it was recognized that other provisions would have to be made for the forestry work, and the Pacific Logging Congress, realizing the importance of the work in promoting the forest and lumber interests of the State, had a bill introduced appropriating money for a Forestry Building. The legislature, however, did not deem it practicable to make the appropriation. Since then the number of students in forestry and logging engineering has increased more than 130 per cent. It is impossible to do successful work in the present quarters, and there is no room in any of the other buildings of the College to which it could be transferred. The Forestry Building is an immediate necessity.

**Forestry Building
Needed.**

In each biennial report during the past six years, emphasis has been placed upon the necessity of providing a Library Building. The Library occupies parts of the Administration Building, the oldest building on the campus. The books are stored in six classrooms on two different floors, and for practical purposes are largely inaccessible. The reading room, the largest in the building, has a maximum capacity of only 120 readers, although the College community aggregates, during certain seasons of the year, more than two thousand people. Furthermore, the building is unsafe. There are marked evidences of weakness, and should the building be longer used for library purposes, it will be necessary to brace it by rods and other means in order to hold it together under the heavy weight of books. The Library now contains more than 68,000 books and pamphlets. Nearly 10,000 volumes were added by gift and purchase during the past biennium. As stated by the Librarian in her report: "From the point of view of both service and storage, relief in the matter of housing the Library has become imperative."

**New Library
Imperative**

A number of engineering departments, also, and the department of Physics, are in urgent need of more room. By adding a third story to Mechanical Hall, this building, with slight alterations, could be used for a number of years for the departments of Physics and Electrical Engineering. A few classrooms in this building would be available temporarily for civil and highway engineering. But a new building will be required, with large laboratory rooms especially planned for the work in experimental, hydraulic, gas, and steam engineering.

Several important though comparatively inexpensive buildings are also needed by different departments in Agriculture. These include a hog barn, a veterinary laboratory, a sheep barn, and a grain and feed storage building.

The large growth of the College and the extended organization required in the efficient management of its affairs have increased the administration work of the institution out of all proportion with the available room for it. A new Administration Building will be necessary in the very near future, or special provision must be made in other buildings for the administration work.

It is apparent, therefore, that the most rigorous economy will be necessary throughout all divisions of the College, in order that funds may be made available with which to provide additional room. Even then, a number of years will be required in securing buildings badly needed at the present time.

Before it was known that the income for 1915 would be reduced, as explained on another page of this report, it was planned that two units of the Forestry Building and two or three of the smaller agricultural buildings should be provided in 1913, and that approximately \$50,000 with which to start the Library Building would be available in 1916. It will now be necessary to defer building opera-

**Building Plans
for 1915, 1916.**

tions for a year. The building fund, furthermore, will be smaller than originally contemplated. But by following the plan indicated above for increasing the building fund for 1916, it is expected that one unit of the Forestry Building and one or two small agricultural buildings can be provided during that year. It is hoped that in 1917 a start, at least, can be made on the Library Building. However, some additional laboratory space must in some way be provided during these years for the engineering work.

By the end of the next biennium the transition period in the change from the old to the new system of financing the College will have been passed, and it is hoped that the institution thereafter will be on a permanent and more satisfactory financial basis. The

**Permanent
Financial Basis.**

Experiment Station and the Extension Service are financed by continuing annual appropriations provided by the Federal Government and the State, and the mill-tax law, enacted in 1913, should, in time, prove a reasonably satisfactory method of providing funds for resident instruction. Although the present income is inadequate to meet the requirements of the College, particularly for new buildings, it is the policy of the College authorities to use the funds provided in a way best adapted to the varying needs of the institution.

Respectfully submitted,

W. J. KERR.

President of the College.

January 12, 1915.

REPORT OF THE SCHOOL OF AGRICULTURE AND AGRICULTURAL EXPERIMENT STATION

To the President of the College,

Sir: The Board of Regents, by increasing the requirements for admission to our degree courses, providing for Vocational courses, and centralizing the administration of the School of Agriculture and the Experiment Station in one office, have made it possible materially to raise the standard of our courses of study and to bring about a closer coordination of the instructional and investigational work in Agriculture.

THE SCHOOL OF AGRICULTURE.

In previous Biennial Reports I have called attention to the almost phenomenal growth of the School of Agriculture, and I am pleased to be able to report again that this rapid development has continued throughout the present biennium. I am also glad to report that the growth in attendance has been accompanied by a corresponding increase in faculty, in improved facilities, in a general betterment of our instructional work, and a wider recognition of the facilities offered by this institution for graduate work. The last statement is suggested by the fact that the number of graduate students in Agriculture has increased during the biennium approximately 120 per cent. The increase in number of students and faculty in the School of Agriculture from 1906-07 to 1914-15 is shown in Table I.

Table I. Increase in No. of Students and Faculty in School of Agriculture 1906-07 to 1914-15.

	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15*
Long Course	80	109	187	218	237	303	429	496	493
Short Course	56	70	130	420	407	1432	1057	919	
Faculty	8	14	19	22	25	28	30	44	48

Courses of Instruction. Advantage was taken of the opportunity provided by the increase in entrance requirements completely to revise and standardize the courses of instruction. Since these courses are fully described in the College catalogue, however, any detailed description of them at this time seems unnecessary. In general, it may be stated that

*To October 27, 1914, only.

SCHOOL OF AGRICULTURE

the work of resident instruction in Agriculture is grouped into the following courses:

1. Vocational Courses in Agriculture
 - a. General Farm Practice.....(1 yr.)
 - b. Dairy Production.....(1 yr.)
 - c. Dairy Manufacturing.....(1 yr.)
 - d. Animal Husbandry.....(1 yr.)
 - e. Horticulture.....(1 yr.)
 - f. Poultry Husbandry.....(1 yr.)
2. Degree Course in General Agriculture.....(4 yrs.)
3. Degree Courses in Agronomy
 - a. General Agronomy.....(4 yrs.)
 - b. Soils, Specialized Course.....(4 yrs.)
 - c. Crops, Specialized Course.....(4 yrs.)
 - d. Irrigated Farming.....(4 yrs.)
 - e. Farm Management.....(4 yrs.)
4. Degree Courses in Animal Husbandry.....(4 yrs.)
5. Degree Courses in Dairy Husbandry
 - a. Dairy Production.....(4 yrs.)
 - b. Dairy Manufacturing.....(4 yrs.)
6. Degree Courses in Horticulture
 - a. Pomology.....(4 yrs.)
 - b. Olericulture.....(4 yrs.)
 - c. Floriculture.....(4 yrs.)
 - d. Landscape Gardening.....(4 yrs.)
7. Degree Course in Poultry Husbandry.....(4 yrs.)
8. Degree Course in Agricultural Chemistry.....(4 yrs.)
9. Degree Course in Agricultural Bacteriology.....(4 yrs.)
10. Degree Course in Economic Entomology.....(4 yrs.)
11. Degree Course in Botany and Plant Pathology.....(4 yrs.)
12. Degree Course in Economic Zoology.....(4 yrs.)
13. Degree Course in Agriculture for Teachers.....(4 yrs.)
14. Graduate Work in Agriculture.....(2 yrs.)
15. Winter Short Course in (a) Agronomy, (b) Animal Husbandry, (c) Horticulture, (d) Dairying, (e) Poultry Husbandry, (f) Crop Pests.....(4 weeks)
16. Summer Courses in (a) Agronomy, (b) Animal Husbandry, (c) Dairy Husbandry, (d) Horticulture, (e) Poultry Husbandry.....(6 weeks)

In addition to the above work of resident instruction, the members of the staff of the School of Agriculture and the Experiment Station assist, under the auspices of the Extension department, in the exercises of Farmers' Week, in the various movable schools of Agriculture, in exhibiting and judging at State and county fairs and expositions, in delivering miscellaneous lectures, and in preparing general bulletins of information and press articles; they examine and report upon many miscellaneous samples and specimens, and conduct a correspondence aggregating more than 50,000 letters a year.

The Vocational Courses. Beginning with the year 1914-15, the old Secondary Courses have been discontinued, and Vocational Courses have been substituted. These one-year courses are provided especially for those who have had no opportunity to pursue their public school courses beyond the eighth grade, or who, from necessity or choice, desire, upon completing the work of this grade, to obtain as quickly as possible a working knowledge of the principles of agricultural practice. They are also open to students with one or more years of high school preparation, and to men of mature years and practical experience, who may desire to familiarize themselves with the most modern thought on this subject. Those who pursue the one-year course in Agriculture will have the opportunity of specializing in general farm practice, animal husbandry, horticulture, or poultry husbandry; and those who pursue the one-year course in Dairying will have the opportunity of specializing in Dairy Production or Dairy Manufacturing.

In this State there are thousands of young men who are to become our future farmers and orchardists. It is to the interest both of the individual and of the State that these young men should keep pace with the rapid development of agriculture. Each and every one should have, if possible, the opportunity of obtaining an agricultural education. Many

of them are so situated, however, that it is impossible for them to attend any of our regular four-year courses. There are also many mature men well past the usual school age, no doubt, who desire to acquaint themselves more fully with the more recent developments in agricultural science and practice. There are also youths in various localities of the State whose high schools offer none of the agricultural training that they desire to undertake. It is to meet the needs of such men, both young and old, that these one-year courses are offered. They are designed to provide the largest amount of practical information and training that can be given in one year. The Vocational work in Agriculture offered during the first year totals 81 semester credit hours.

The Degree Courses. The various degree courses in Agriculture are open during the year 1914-15 only to those who have completed the equivalent of at least three years of the Oregon State high school course; in 1915-16, and thereafter, they will be open only to those students who have completed the full four-years' course of a State high school. The aim of these degree courses is to train young men to become successful farmers, stockmen, and fruit growers; to equip them to become efficient managers of orchard and ranch properties and of agricultural and cooperative organizations; to prepare them to become specialists in some branch of agricultural college or experiment station work, or to fit them to become teachers of agriculture in the public schools. In short, they offer to those who have faith in the farm and in rural life, opportunities for individual development and technical training equal to those provided for the educated in other professions.

Including the courses in Agricultural Chemistry, which are provided in the department of Chemistry, there are given by the departments of the School of Agriculture a total of 227 courses of instruction, with a total of 659 semester credits. This is an increase during the biennium of 14.6 per cent in the number of courses of instruction offered and of 25.23 per cent in the number of semester credits. This increase in the number of semester credits given has also been accompanied by a large increase in the amount of work required for each credit. It should also be noted that, owing to the large number of students in many of the courses—particularly those of the Freshman and Sophomore years, we have been compelled to maintain five sections, thus further increasing the instructional requirements. In fact, the semester credits of all sections of all courses make a total of 864 instead of 659 as shown in the above percentage increase.

Changes in the faculty of the School of Agriculture and the Experiment Station since July 1, 1913, including resignations, promotions, and additions to the staff, are given below. Since the complete list of the present staff is included with the members of the faculty listed elsewhere in this publication, the names are not listed in the report of this School.

Resignations.

M. M. McCool, Assistant Professor of Soil.

Lyman Bundy, Research Assistant in Agricultural Chemistry.

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- H. E. Ewing, Research Assistant in Entomology.
- J. M. Speidel, Instructor in Horticulture.
- V. I. Safro, Research Assistant in Entomology.
- G. H. Godfrey, Research Assistant in Plant Pathology.
- A. M. Woodman, Orchard Foreman.
- F. C. Bradford, Research Assistant in Horticulture.
- *C. C. Lamb, Foreman Poultry Plant.
- B. W. Hollis, Instructor in Veterinary Medicine.
- E. P. Walls, Instructor in Botany.
- A. F. Lafky, Orchard Foreman.
- G. C. Ralston, Research Fellow in Horticulture.

Promotions.

- A. B. Cordley, from Dean of the School of Agriculture to Dean of the School of Agriculture and Director of the Experiment Station.
- C. I. Lewis, from Professor of Horticulture to Vice-Director of the Experiment Station and Professor of Horticulture.
- G. F. Sykes, from Assistant Professor of Zoology and Physiology to Professor of Zoology and Physiology.
- B. T. Simms, from Assistant Professor of Veterinary Medicine to Professor of Veterinary Medicine.
- F. L. Griffin, from Associate Professor of Agricultural Education to Professor of Agricultural Education.
- H. F. Wilson, from Assistant Professor of Entomology to Professor of Entomology.
- A. F. Barss, from Research Fellow in Horticulture to Research Assistant in Horticulture.
- J. E. Cooter, from Teaching Fellow in Agronomy to Instructor in Agronomy.
- A. F. Vass, from Research Assistant in Bacteriology to Assistant Professor of Bacteriology.
- C. C. Starring, from Research Fellow in Horticulture to Horticulturist of the Hood River Branch Experiment Station.

Additions.

- C. H. Kennedy, Assistant Professor of Animal Husbandry and Secretary of the State Stallion Registration Board.
- A. C. Chandler, Instructor in Zoology and Physiology.
- D. C. Howard, Instructor in Dairy Husbandry.
- Clara Nixon, Fellow in Poultry Husbandry and Agricultural Chemistry.
- Ralph McBurney, Instructor in Bacteriology.
- LeRoy Childs, Research Assistant in Entomology.
- C. S. Brewster, Research Assistant in Poultry Husbandry.
- R. M. Rutledge, Secretary to Dean and Director.
- R. R. Graves, Professor of Dairy Husbandry.
- I. H. Blake, Instructor in Zoology and Physiology.

*Transferred to Extension Service.

- W. M. Atwood, Instructor in Botany.
- B. T. Simms, Assistant Professor in Veterinary Medicine.
- O. M. Nelson, Instructor in Animal Husbandry.
- G. D. Horton, Instructor in Bacteriology.
- A. M. Woodman, Orchard Foreman.
- W. P. Tufts, Instructor in Horticulture.
- J. E. Cooter, Teaching Fellow in Agronomy.
- R. A. Marshall, Teaching Fellow in Horticulture.
- C. M. Scherer, Teaching Fellow in Plant Pathology.
- F. L. Griffin, Associate Professor of Agricultural Education.
- R. A. Dutcher, Instructor in Agricultural Chemistry.
- J. H. Corsaut, Research Fellow in Plant Pathology.
- J. W. Hyland, Teaching Fellow in Zoology.
- A. F. Barss, Research Fellow in Horticulture.
- G. B. Posey, Teaching Fellow in Plant Pathology.
- R. F. Beard, Research Assistant in Agricultural Chemistry.
- C. S. Brewster, Research Assistant in Poultry Husbandry.
- G. H. Godfrey, Research Assistant in Plant Pathology.
- J. R. Magness, Research Fellow in Horticulture.
- F. L. Robinson, Foreman Stock Farm.
- G. F. Moznette, Research Assistant in Entomology.
- C. V. Ruzek, Assistant Professor of Soils.
- C. E. Schuster, Teaching Fellow in Horticulture.
- G. L. Philp, Research Fellow in Horticulture.
- M. P. Henderson, Pathologist Southern Oregon Branch Exp. Station.
- H. A. Lindgren, Superintendent Branch Exp. Station Clatsop County.
- H. M. Carnes, Research Assistant in Agronomy (In cooperation with U. S. Department of Agriculture).
- S. H. Hammond, Instructor in Botany.
- J. R. Winston, Pathologist, Hood River Branch Experiment Station.
- I. E. Fields, Foreman Sherman County Dry Farming Branch Exp. Station.
- Obil Shattuck, Assistant in Harney Valley Branch Exp. Station.
- Andrew C. McCormick, Assistant in Southern Oregon Exp. Station.
- C. C. Starring, Research Fellow in Horticulture.
- Harry A. Schoth, Teaching Fellow in Agronomy.
- G. K. Van Gundia, Teaching Fellow in Botany.

Increased Facilities. In previous reports I have felt compelled to refer to the entirely inadequate facilities for instructional work in Animal Husbandry and Poultry Husbandry. It is therefore exceedingly gratifying to report that facilities have been materially increased during the biennium. One of the chief aims of the Dean and Director, and one which has received every possible encouragement and assistance from the President, has been to provide for these departments, and the department of Dairy Husbandry, such equipment and assistance as might be necessary to enable them to do really efficient work.

In the prosecution of this ideal, a beef-cattle and sheep barn has

been erected for the department of Animal Husbandry. This barn is located just west of the old barns and has a floor space of 52 x 120 feet for sheltering stock. The hay loft has a storage capacity for 300 tons of hay and straw. Adjoining the barn are several concrete-floored exercise lots. Especial conveniences are provided for the feeding, watering, weighing, and handling of live stock. The west half of the barn is at present devoted to beef cattle and the east half to sheep, although it has been planned that the entire barn be eventually used for beef cattle.

Several buildings especially planned for the department of Poultry Husbandry have also been erected. The main poultry building is a three-story structure and is used principally for class, laboratory, and demonstration purposes. It contains a demonstrating room with desks and other necessary equipment; a shop with the necessary tools, benches, and equipment for practice work in building poultry-plant equipment; storage rooms, office, and wash rooms are also provided. In the basement, rooms are provided for fattening and killing fowls, an incubator room for student use, and a feed room with the necessary machinery for grinding and mixing poultry feeds. Besides the main poultry building, there is an incubator house, with a capacity for twenty-four incubators and complementary apparatus; and a feed-storage building and a brooding house. There are also colony houses for laying and breeding stock and for growing chicks. The colony houses, which are movable, are constructed upon a plan that could be adopted by any farmer. The colony breeding coops are also portable, and are used for investigations in both natural and artificial hatching.

The herds and flocks of the department of Animal Husbandry have been greatly improved in quality, representatives of several breeds not before included have been added, and the total number of animals has been fully doubled.

The dairy herd has been much improved by the purchase of several superb animals of each of the four leading dairy breeds. The creamery, also, has been remodelled and its equipment and capacity increased.

Altogether, it is believed that the facilities now provided for the work of these three departments, as well as the work that is actually being done by them, are fully equal to those of other departments of the School of Agriculture and are rarely excelled elsewhere.

NEEDS OF THE SCHOOL OF AGRICULTURE.

Department of Farm Management. The work of the various departments of the School of Agriculture has been progressing, as has been indicated, in a very satisfactory manner. Through the research activities of the Experiment Station, many problems are being studied and much information has been accumulated which is of interest and value to the farmers of the State. Each of these departments is interested in a special subject, or group of subjects, and most of the results already obtained relate to more or less isolated problems of production. The production

of large crops and of superior live stock, while fundamental, is, however, only one phase of good farming.

That the agriculture of the State may be placed upon a permanently successful basis it is essential that the large crops and superior animals be produced economically and disposed of to the best advantage. In other words, not some, but all, of the factors of production and of marketing as applied to the problems of the individual farmer, must be investigated and the results so correlated as to indicate the most economical and profitable systems of farm management. In view of the exceedingly great importance of this work, and the constantly increasing demands for it, I respectfully recommend that a department of Farm Management be organized within the School of Agriculture at the earliest date practicable.

Additional Land. In special reports I have called attention to the urgent need for more land in connection with our instructional work in Agriculture. The College owns 340 acres, but after the campus, orchard, experimental plots, Poultry Plant, and the grounds surrounding the farm buildings are withdrawn, we have left for general farm operations less than 100 acres. This is entirely inadequate to provide pasture and forage requirements for the herds and flocks of the Dairy and Animal Husbandry departments; or to provide the necessary land for the crop production work of the department of Agronomy. To meet these necessary requirements, we are at present renting approximately 320 acres from various owners, much of which is inconveniently located, and, consequently, expensive to operate.

Due consideration should also be given, in this connection, to the fact that our herds and flocks should be materially increased. The dairy barn, when devoted entirely to dairy purposes, is capable of accommodating sixty cows and an equal number of young stock; and to give the rapidly increasing number of Agricultural students the facilities they should have for practical work in dairy husbandry, the dairy herd should be increased as rapidly as possible to the limit of the present barn capacity, or, at least, until we have good representative herds of the four leading dairy breeds. These enlarged herds will require additional land.

If the work in Animal Husbandry, moreover, is to develop to a point commensurate with the importance of the industry and the number of students interested, its flocks and herds should also be increased until they contain equally representative herds of the leading breeds of beef cattle, sheep, swine, and horses. To provide the necessary pasture and forage requirements for these herds and flocks, and also requisite land for the necessary grain-production work of the department of Agronomy, provision should be made for purchasing not less than 350 to 400 acres.

Buildings. Of the needed buildings mentioned in my last Biennial Report, only the Stock Barn and the Poultry Building have been completed. Increased instructional requirements, the steady growth of our equipment of live stock, and the consequent necessity of enlarging our

farm operations make necessary the early erection of a number of additional farm buildings.

The present facilities for both the experimental and instructional work with swine are entirely inadequate, unsightly, and unsanitary. Plans have been prepared for a model hog barn which will provide adequate and satisfactory accommodations for the work, and which can be erected for approximately \$4,500.

The only feasible plan for handling the manure from all of the College barns, if offense to the surrounding property owners and to the occupants of the dormitories is to be avoided, is to build a permanent manure yard located well back of the Farm, some distance from all residence property and all College buildings. Such a structure, adequate for storing the manure from all of the barns, will cost approximately \$500.

A Veterinary Building should be provided as soon as possible. Satisfactory work in this important subject can not be given until adequate provision is made for more clinics. This building should include an anatomical and post-mortem laboratory, where dissection and post-mortem work can be given; a clinical and operating room, where all classes of clinical and surgical work can be demonstrated; stables for the isolation of contagious cases, etc. The character of the work precludes the use of other buildings for veterinary purposes, thus making it necessary to provide a special building. This can be erected at an estimated cost of \$8,000 to \$10,000.

The need of a Seed and Feed-Storage Building was fully described in my last report, and should be again emphasized. The present seed room in the barn was put in with the expectation that this space, which will soon be needed to accommodate our increased dairy herd, could be used only temporarily. It is entirely inadequate for the purpose, and the lack of proper accommodations for storing seed has resulted not only in much inconvenience but considerable loss.

While a wooden structure could be erected that would be adequate for seed-storage purposes for about \$3,000, this would not be the most desirable type of building, and would not give accommodations for the storage and handling of large amounts of feed.

A cement building has been planned, which will serve for the storage of seeds and for large quantities of feed. The building, a two-story structure, will be a model of its kind. The floors, walls, and bin partitions are to be of cement. On the first floor, the main room will be used as a threshing, cleaning, weighing, and shipping room, equipped with a motor-driven separator, headrow thresher, fanning mill, grain grader, scales, etc. Surrounding this room are large cement storage bins for seed that is to be marketed, shelves with galvanized iron containers for selected seed for Station plantings, fumigation room for treatment of seed for diseases and pests, and large kiln for drying seed corn. Underneath the first floor will be a basement room with bins for storage of selected potato seed, roots, etc. On the second floor will be curing and

storage room for grain in the straw, forage-crop samples, and exhibits, etc., large-capacity rack room for storage of the corn from the kiln; seed breeding room where the winter's work with the head and plant selections will be done and the same stored. At one end of the building will be cement feed-storage tanks, two stories in height and divided vertically into five or six cells of the estimated required capacity for the different kinds of feed used for the different departments. These feed storage tanks will have sufficient capacity to permit buying in carload lots or from the field at harvest time. In connection with this feed storage will be a motor-driven grinder, dump platform for unloading wagons, and motor-driven cup elevator for elevating the grain into the tanks. Outside the building will be a driveway and scales, so that the wagons taking away grain can be loaded by gravity. The structure will be fire- and mouse-proof. The estimated cost is \$20,000.

Much interest is now developing over the Pacific Northwest in the question of horticultural by-products. The Horticultural division reports that a heavy correspondence relating to this phase of horticulture is being received, and that some students are already pursuing work along this line. Many industries succeed in proportion to the profit which may be realized from their respective by-products, and I feel that this institution could be of great service to the horticultural interests of the State were we to make provision for research work and courses of instruction relating to the various horticultural by-products. The utilization of culls and other waste products will become more and more important with the development of the industry. If this research and instructional work is to be undertaken, a by-products building of considerable size, but not necessarily expensive, will be required. Fifteen thousand dollars would probably suffice to provide both building and equipment. There is no doubt that the great value of the work to the fruit industry of the State would abundantly justify the expenditure.

The rapid development of our dairy herd will soon make it necessary to devote the Dairy Barn exclusively to dairy purposes. The necessity of making other provision for the horses now accommodated there and the purchase of additional horses which will be needed to conduct our farm operations will make it imperative that a horse barn be erected in the near future. No plans for this structure have as yet been prepared, but a rough estimate would place the cost of a suitable structure at \$15,000.

In my last report I emphasized the need of better greenhouse facilities for the departments of Horticulture, Agronomy, Botany, and Entomology. The development of the work of these departments results in this need becoming more and more urgent. Plans have been prepared for a modern plant to replace the old one and to cost approximately \$35,000. If this cannot all be provided at the present time, I would respectfully urge that one section be erected for the department of Agronomy, at an approximate cost of \$3,500. For both the instructional and the experimental work in Soil Fertility, Soil Physics, Cereal Crops,

Agrostology, Crop Breeding, Irrigation Farming, Dry Farming, etc., a greenhouse is indispensable for the best work. This is especially true of the work in Soil Fertility.

A suitable building for the storage of farm machinery is also needed,—this to replace the old barn, which is used at present for the storage of a portion of the machinery used on the College Farm. The room provided by this building is inadequate and decidedly inconvenient. With the necessary increase in farming land, there will be no possibility of this old structure accommodating the increased machinery equipment. Further, the present Farm Mechanics Laboratory Building does not have adequate room for sheltering the number of large tractors required for instructional work. Unless it is possible to make an addition at the rear end of the present Farm Mechanics Building to care for the tractors, it would seem that the only solution would be to accommodate them in a new machinery building, which could be so planned as to provide room for the farm machinery used by all of the different departments. Such a building, two stories in height, of good design, and constructed of brick and cement, would cost, it is estimated, \$10,000.

There is also need of an Agricultural Auditorium Building, which would cost probably \$30,000 to \$40,000. For a discussion of the needs of this Building, see my last Biennial Report.

Salaries. Attention should be called to the fact that the salaries received by members of our faculty are generally less than those paid for similar service by other like institutions. During the past year several members of our staff have received offers from other institutions, at salaries considerably in excess of what they were receiving here; and while we have been able to retain the services of most of these men, they have remained only because of interest in their work here and at considerable personal sacrifice. Since the value, to the State, of the faculty as a whole, increases considerably each year, by reason of increased experience and knowledge of local conditions, I feel that such provision should be made for salary increases as may serve to retain the members of the faculty in the service of the College and of the State.

THE EXPERIMENT STATION.

After nearly sixteen years of most efficient service as Director of the Oregon Agricultural College Experiment Station, Dr. James Withycombe tendered his resignation to the Board of Regents with the request that it become effective March 31, 1914. On April 8, 1914, the writer, who had served as Dean of the School of Agriculture during the past six years, was promoted to the position of Dean of the School of Agriculture and Director of the Agricultural Experiment Station. By mutual agreement between Dr. Withycombe and his successor, it was arranged that his final report, which has already been filed, should cover the work of the Experiment Station to June 30, 1914. It seems necessary in this report,

therefore, only briefly to refer to certain minor changes which have been made in the organization of the work.

The principal changes mentioned above may be summarized as follows:

1. The correspondence of the School of Agriculture has grown during recent years to become a burden upon many of the departments, and more or less complaint has been received regarding the inadequacy of the service. In an attempt to relieve the various departments of as much of the routine correspondence as possible, a central stenographic office has been organized which receives all of the mail not addressed specifically to individuals, indexes it, answers as much of the routine correspondence as possible, and refers the remainder directly to the proper persons for reply. The office also has charge of all outgoing mail and the mailing of all publications, both of the Experiment Station and of the Extension Service, and does all manifolding for the School of Agriculture and the Experiment Station. As fast as possible, circular letters are being prepared for use in answering more completely than could well be done by individual correspondence, most of the more common requests for information. To facilitate the work, dictating machines, an electrically operated multigraph, a mimeograph, and an addressograph have been installed in the central office, and dictating machines in all of the departments. This central office, known as the College Exchange, has been in operation since August 1, and is giving the best of satisfaction.

2. A committee has been appointed for the purpose of drafting articles of agreement which shall, so far as possible, define the relations between the various departments. This committee has completed its labors and has submitted a report, which, however, has not as yet been finally considered and approved.

3. Recognizing the fact that many experiments become increasingly valuable the longer they are continued, and that usually no experiment should be abandoned without careful consideration, it has been thought best to make only slight changes in the experimental work which had already been inaugurated. It was thought, however, that greater definiteness and stability to the work would result if each project under investigation was more fully outlined and a copy of the outline filed in this office. In conformity with this plan, outlines for approximately eighty projects have been filed and approved.

Publications. Since April 8, the following bulletins and reports have been issued by the Experiment Station:

Bulletin 119, "A Report on the Experimental and Demonstration Work of the Substation Farms at Moro, Burns, Redmond, and Metolius." pp. 188.

Bulletin 120, "Improving Sandy Soils by the Use of Green Manure Crops." pp. 14.

Bulletin 121, "The Common Red Spider, or Spider Mite." pp. 97.

AGRICULTURAL EXPERIMENT STATION

Bulletin 122, "Irrigation and Soil-Moisture Investigations in Western Oregon." pp. 110.

Bulletin 123, "An Inquiry into the Nature of a Somatic Segregation of Characters in the Le Conte Pear." pp. 18.

Second Biennial Crop Pest and Horticultural Report.

Four other bulletins are ready for publication; and in addition I am submitting for publication herewith a brief report from each of the various branch experiment stations.

Respectfully submitted,

A. B. CORDLEY,

Dean and Director.

REPORT OF THE AGRICULTURAL EXPERIMENT STATION.

To the President of the College,

Sir: I have the honor to submit herewith the biennial report of the Oregon Experiment Station for the years 1912-13 and 1913-14 inclusive.

The work of the Station during the biennium has made good progress, and in some departments phenomenal results have been achieved.

Brief Review of Growth and Services of the Station.

Since this report concludes my services as Director of the Experiment Station, I beg your indulgence for this deviation in presenting a brief review of the progress of the Station, and the development of agriculture throughout the State during the past sixteen years, concurrent with my administration as Director of the Experiment Station.

In 1898 there were ten members of the Station Staff; at this date there are forty-five. In 1898 there was the home Station with its five departments; now there are in addition to the home Station seven branch stations and some twelve cooperative experimental plats, with nine departments.

The total value of the agricultural products of the State in 1898 was less than thirty million dollars, while the total value of these products in 1913 was \$139,505,328.

Dairying, during the past sixteen years, has shown a phenomenal growth in production, having increased in value from less than three million dollars to \$18,425,000. Poultry has also shown a large increase in production; and the production of clover seed has grown from practically nothing to a crop valued at two million dollars.

Perhaps the most notable value of the Experiment Station work has been its influence for better agricultural and horticultural practices throughout the State, including its influence for better methods of handling live stock, especially the growing and fattening of swine.

The demonstration work of the Station, showing improved methods of moisture conservation, has been worth millions of dollars to the farmers in the drier sections of the State. These demonstrations, in fact, have shown that lean years may be largely averted in dry-farm districts.

The Experiment Station, in short, has pointed the way for a more successful agriculture, and has endeavored at all times to meet, to the best of its ability, every demand made upon it by this great and growing industry.

Report for Biennium 1912-14.

No changes in staff of any moment have occurred during the biennium.

In the spring of 1913 the Hood River Branch Experiment Station was organized, with Messrs. J. R. Winston, plant pathologist, C. C. Starring, horticulturist, and A. L. Lovett, entomologist. The work of this station has made excellent progress, and good results to the horticultural interests of the district have been achieved. Much preliminary work for the establishment of the Clatsop County branch experiment station has been accomplished; but it is as yet unorganized on account of the lack of proper building facilities.* The investigative work of this station will be along the lines of dairying, small fruits, and vegetable gardening, these being the principal agricultural industries to which the district seems to be especially adapted.

During the biennium the Station was able to cope with practically all of the important problems for which a pressing need for a more or less immediate solution was felt. It is thought, however, that further investigative work should be undertaken, at the earliest practicable opportunity, with control methods for fire blight. The Southern Oregon branch experiment station has undertaken a very extensive variety test with American and European pears with the hope of finding varieties of commercial value which are immune to this scourage, or with the hope of at least securing a vigorous, immune stock. In cooperation with this work a well-equipped laboratory should be maintained and placed in charge of a thoroughly trained scientist for conducting pathological experimental investigations.

One of the most pressing needs of the Station at this time is a fund for Station publications. There is a great deal of valuable accumulated experimental data that should be in the hands of the farmers, but the funds of the Station available for such purposes are not adequate to publish this information.

The acquirement of the 115 acres of additional land is proving very helpful to the work of the Station. This land is devoted mainly to live-stock husbandry, principally to the experimental feeding of sheep and swine. Twenty acres is utilized as an experimental orchard, and twenty acres as a poultry breeding farm for egg production.

Facilities for Station work have been materially improved during the biennium. The remodeling of Science Hall has greatly increased the laboratory efficiency of the chemical department, and much-needed laboratory equipment has been acquired by other departments.

The following is submitted as a synopsis of departmental reports relating to the principal problems under investigation. Many facts in relation to this work have been published in the Biennial Crop Pest and Horticultural Report for the years 1911-12.

*For information concerning the progress of work at the Clatsop County branch experiment station, since this report was written, consult the Report of The John Jacob Astor Branch Experiment Station, Dec. 1914.

DIVISION OF HORTICULTURE.

ADAMS INVESTIGATIONS.

Project No. 1. Pollination. During the biennium a research bulletin, *The Gross Morphology of the Apple*, was issued, giving investigative data of work under the pollination project. A digest of this bulletin, which is one of a series of three on the Pollination of Pomaceous Fruits, may be briefly given, for the untechnical reader, as follows:

The major part of the edible portion of an apple or pear is of the same nature as is the tissue composing the stem. It may be considered as a hollowed-out stem which bears within it small fruits much resembling plums in structure. These findings, as set forth in the bulletin, are of interest and importance because they show that those conditions which modify stem structures, and only those, can modify the edible portion of the fruit, and that the latter is not changed directly by the influences of one or another kind of pollen.

Fruit-bud formation, especially with the Yellow Newtown apple, is being studied as a phase of the pollination problem. A complete study of the bud is being made from the time it begins to assume form up to the development of the fruit. The study is essential since there may arise and exist among the blooms on a tree abnormalities which would render them incapable of developing into fruit even though ideal conditions for pollination existed. It is estimated that eighty per cent of the work of this phase of the problem is completed. Comparisons of the developing buds in different positions on the tree indicate that differentiation into fruit or leaf buds takes place at different times. This confirms the conclusions of Goff. The investigation has shown that there is greater uniformity in this regard among the buds on spurs which have already borne fruit than there is among buds that are forming on young wood that has not borne fruit.

The study of the fibro-vascular system of the apple has been completed, and while other investigators, notably McAlpine of Australia, have contributed information on this subject, no record reveals the thoroughness and completeness of detail shown in the study made by this Station. Excellent progress has been made in the histological and cytological investigations on the pollen and ovules of the apple and pear.

Project No. 2. Irrigation Work with Apples. Conditions were unfavorable for this work during the summer of 1912, owing to an unusual amount of rain. A series of investigations in greenhouses, however, were undertaken, which are closely allied to the irrigation problem. Various amounts of water have been applied to potted dwarf pear trees, and a study of the effects not only on the external characters of the tree as to its growth, color, etc., was made, but a complete tissue study as well. (Second Biennial Crop Pest and Horticultural Report.)

New Projects. Two new projects have been accepted under the Adams Act. The first is concerned with pruning and the title suggested

is, "A Histological and Physiological Study of the Buds of Pomaceous Trees as Influenced by Pruning." A young orchard of 320 trees, with probably additional plantings, will be utilized for this investigation, and the Southern Oregon Station pruning blocks will be made available for supplemental data.

The second new problem is a study of "Critical Temperatures." Some important preliminary work has already been done, and with the dwarf trees, greenhouses, and cold-storage plant available for these studies, good results should be secured.

HATCH INVESTIGATIONS.

Most of the problems under this fund are supplemented with the Crop Pest Fund.

Problem No. 1. **Strawberry Variety Investigations.** Extensive experiments have been conducted for several years in the variety testing of strawberries. Altogether 196 varieties have been tested. Of these varieties eight may be said to have approached the ideal commercial standards established for this test. Two of these were the "Jucunda" and "Triomphe de Gand." These were among the early varieties introduced into Oregon and were grown for local use only. The other six varieties, namely, Wilson, Clark, Magoon, Marshall, Oregon, and Gold Dollar, are still being grown commercially. The Wilson, however, is gradually losing ground. This berry is of eastern origin. The Marshall, which commercially ranks fifth in the State, is of Massachusetts origin. The first two named are of European origin, and the Clark, Magoon, Oregon, and Gold Dollar originated in this State. These four for the past five years have given the best results at this Station. While many of the eastern varieties succeeded perhaps as well as in the East, they do not meet the commercial requirements of the West. It is possible that other eastern varieties may later be introduced that will prove superior to those tested. The Gold Dollar may be recommended as our most satisfactory early variety for the Oregon grower. It is soft in texture, however, and cannot be shipped to any considerable distance. The Magoon is the most popular main-season variety for the markets, but is a poor shipper and not desirable for canning. In some localities the Marshall takes the place of the Magoon. The Clark is the leading variety for shipping and canning, and the Wilson is an excellent canning variety for some of the stronger soils. The Oregon is a good variety for strictly local markets, having a very long fruiting season, and good quality, and is therefore valuable for the home garden. (Second Biennial Crop Pest and Horticultural Report.)

Problem No. 2. **Strawberry Breeding.** For several years this Station has been working on the strawberry breeding problem. From a large number of seedlings, two or three of great promise have been selected. One of these seems to have embodied the qualities of the Magoon and the Clark. It is too early yet, however, to draw conclusions. The mother plants are very promising.

A pedigree study of strawberries has been completed which will be a distinctive contribution to the knowledge of plant breeding.

Problem No. 3. Loganberry Investigations. a. Loganberry Fertilizers. Fertilizing experiments with loganberries have been continued during the past season, but results do not warrant conclusions at this time.

b. Loganberry Pruning Investigations. A commercial planting of loganberries has been made in the new orchard tract where an investigation of various systems of pruning and training may be made. There is a great demand for this information among the growers of this State.

Problem No. 4. Cherry-Breeding Investigations. A large number of cherry seeds of known parentage has been secured. These seeds have been preserved and are planted with the hope of securing a goodly number of promising seedlings. There is a large field for this work in the State, and the purpose of the work is to determine the value of certain cherries for breeding stock and to produce commercial cherries of merit for the Pacific Coast.

Problem No. 5. Apple-Breeding Investigations. During the past six years apple seeds have been secured from the pollination experiments. These seeds are of known parentage. Seedlings obtained from these seeds have been grafted upon dwarf trees and will soon begin to fruit. The purpose of this investigation is to ascertain the value of certain apples for breeding, with the hope that valuable commercial varieties may be obtained.

Problem No. 6. Prune-Breeding Investigations. Some progress has been made in prune breeding, and it is contemplated to take up the pollination of the prune similar to the work conducted with the cherry for the past three years. In this way useful data should be secured to aid in the origination of a superior prune to that which is at present grown.

Problem No. 7. Cover-Crop Investigations. For this work between 500 and 600 dwarf apple trees on Doucin stocks have been set. These trees will be utilized in a series of experiments relating to cover crops, tillage, mulches, etc.

Problem No. 8. Nut Variety Tests. A large collection of walnuts and other nuts have been planted in the new orchard, and these, with those growing in the home orchard, should supply valuable data as to the best commercial varieties.

TRIAL GARDENS.

In cooperation with the Bureau of Plant Industry, a trial garden has been established to test out from time to time new introductions.

VEGETABLE INVESTIGATIONS.

Investigations in vegetable gardening are conducted jointly under the Hatch and Crop Pest Funds.

1. Greenhouse Tomato Investigations. This is a continuation of the work undertaken in 1912. The object sought is, first, to determine the best forcing varieties of tomatoes adapted to local conditions of good market requirements; second, to determine the efficiency and economic

value of artificial pollination; third, to make a study of the blossom clusters as to variation of varieties and its relation to the economic production of fruit. Two greenhouses, 30'x20', have been devoted to this work. Both English and American varieties were grown, and the fruit produced was of a very high commercial standard. Table I gives the total number ounces of fruit produced between May 20 and June 20 inclusive, one row each of four plants:

Table I. Fruit Produced (number of ounces) by different varieties of Greenhouse tomatoes, under different methods of pollination, between May 20 and June 20.

Variety	Pollinated by hand	Pollinated by jarring	Not Pollinated
Stone	223½	162½	72½
	243½	142½	48½
Comet	266	239	114½
	186½	182	101
Jewel	169	144	132
	296½	192	104½
B. Best	189		114
	346½	216½	
A-1	152½		90½
A-E 3	132½		92½
Best of All	179		69
S. Earliana	325	280	

2. Onion Investigations. Cooperative work with a number of growers has been undertaken to determine best cultural methods, use of fertilizers, and other factors relating to the industry.

3. Vegetable Type Selection. This is an investigation for the purpose of determining desirable types of vegetables for the canning industry. Seed will be secured of the most desirable types and distributed among commercial seed growers.

CROP PEST INVESTIGATIONS.

Problem No. 1. Prune Fertilizer Investigations. This is a cooperative experiment with two growers in Yamhill County and a large fertilizer firm. The purpose of the work is to secure data as to the influence of fertilizers on the trees, foliage, and fruit, and the effect upon the evaporating qualities of the fruit.

Problem No. 2. Prune Standardization Investigations. The purpose of this work is to effect a definite standard, or standards, for the commercially dried prune in the State. This will include a study of conditions influencing the fruit from the time it is grown until it reaches the consumer, including the technique of evaporation, sanitation, chemistry of the product, molds, insect infestation, processing, grading, and packing for market. The division of Horticulture will receive assistance in this investigation from the departments of Chemistry, Plant Pathology, and Entomology.

Problem No. 3. Loganberry Investigations. These investigations mainly relate to the commercial phases of the fruit, including the evaporated product and the juice.

a. **Evaporation Investigations of the Loganberry.** This work was done at Salem in the dryer of Mr. J. J. McDonald. An attempt has

been made to ascertain if the dried loganberry can be standardized, first, by investigating the time and methods of harvesting the product; second, the possibility of grading it, either in the field or at the evaporator; third, length of time required for evaporation; and fourth, the relation of temperature and air circulation to the product obtained.

It was found that the hard, ripe berries have the best quality and weight; that under average conditions berries should not be picked after noon and preferably not after 10 a. m. There is a very close relation between the dried weight obtained and the general condition of the product on the one hand and the condition in which the berries are brought to the evaporator, on the other. Berries picked after 10 a. m. are apt to be soft, to melt down, caramelize, and scorch more than those which are picked in the early morning. It was found that the length of time given for evaporation was too long—many growers using 30 to 40 hours. The best results were obtained by drying the berries 16 hours and second best by drying 13 hours. The general practice is to run the temperature too low at first, and this condition, coupled with lack of grading in many cases, causes a loss of 2 pounds to the crate, and also gives a large percentage of scorched fruit. It was found better to start the temperature at about 130 degrees and conclude with a temperature of 150 degrees.

b. Loganberry-Juice Investigations. This study was undertaken to determine the commercial value of this product. It was found that by crude methods 75 per cent of juice could be obtained. It was also found that there is a very close relation between the amount of juice obtained and the length of time the berries stand before being pressed. Many formulas were used; but for home use, one part of sugar to three parts of juice by weight is recommended, the juice to be heated to the boiling point and bottled immediately in sterilized bottles. For commercial purposes, ten pounds of sugar to one gallon of juice is the formula suggested. Very ripe berries put up at once give the best aroma and flavor; second best are the dead-ripe berries, which are allowed to remain for twenty-four hours; third best are the hard ripe berries, and the least desirable are the green berries. The ripe berries give the largest percentage of juice. Chemical analysis shows that dead-ripe berries run from 1.78 per cent to 1.88 per cent acidity, while the hard berries and those which are unripe give more than 2 per cent acid; that the ripe berries run from 6.4 per cent to 6.46 per cent in sugar content; that the hard, ripe berries run from 4.91 per cent and the decidedly under-ripe run only 3.5 per cent sugar.

Problem No. 4. **Fruit-Pit Investigations.** Work in this investigation for the past two years has been conducted at the Wallace orchard, Salem, and the Meeker orchard, Corvallis, and also in cooperation with the department of Plant Pathology, at the Hood River branch station. Various fertilizers and different cultural methods have been tried, and in the Meeker orchard toxic substances have been fed to the branches of trees. Results so far do not warrant conclusions.

DEPARTMENT OF BOTANY AND PLANT PATHOLOGY.

ADAMS INVESTIGATIONS.

Project No. 1. Cherry Gummosis. This work has been continued along the same lines as heretofore, since it has been necessary thoroughly to check up and confirm all previous work. A great deal of culture work has been done, as well as inoculation work. Similar troubles have been found upon other drupaceous hosts which are now being investigated, and several strains of the organism have been found. Survey work in certain orchards established the fact that the Lambert cherry suffers less from the disease than does the Bing or the Royal Ann varieties, which seem to differ but little in susceptibility. It was also proved that the Mazzard type of seedling is in general resistant to the disease. Limb grafting on this stock is recommended for the susceptible varieties. During the winter the strains of bacteria isolated the previous season were subjected to sufficient cultural study to indicate that the majority were similar to that isolated by Mr. Griffin—one strain capable of inducing gum-flow differed and was called "strain 2." Lack of incubator facilities resulted in the postponing of the critical work on the physiological and cultural characteristics of the bacteria. During the spring, inoculations and isolation work was done with the same results as in the previous year. From various sources new bacterial strains were isolated, most of them similar to *B. cerasus*, but a few like "strain 2." Late in the spring several apparently saprophytic strains were isolated from lesions, while still later all attempts to secure organisms from the advanced margins of cankers failed, even where the bacterial structures could be found in microscopic sections. This seems to indicate that the bacteria die during the summer in many, at least, of the cankers. In the case of the inoculations, the earliest ones progressed the farthest, but in all cases the spread seemed to be checked by cambial activity before cankers of any size were formed. Gum exudation took place.

Histological study of fresh material was most carefully carried on with specimens of diseased branches and trunks from many sources. Again and again the presence of bacteria was demonstrated in the lesions even in tissues beyond the advancing margin of the discoloration in rapidly spreading cankers, providing rather convincing support for the theory that the disease called "gummosis" is due to their presence. The bacteria seem to advance largely through the phloem tissues in the earlier part of the season, but later this advance seems to be checked by the starting of cambial activity and wound-cork formation in this region, though the lesion may still extend itself to some extent in the outer cortical region until there too wound-cork is formed which limits the season's growth.

Observations on the inoculations of 1912 indicate that no spreading of the lesions produced in that way took place during the past season. This was also true of many natural cankers under observation, though

in some cases there appeared to have been a spreading from some of the old cankers. This seems to lead to the conclusion that the bacteria live over in but few of the cankers from one season to the next.

Cutting out of the diseased tissue found on certain trees early in the season seems to have resulted in a control of the advance of the disease on those trees during this season, accompanied by a rapid callus-formation. Many trees were observed, however, where infections not evident in 1912 have advanced during the succeeding spring at a very rapid pace, giving no external indication of the extent of the injury till new wood began to be formed around the dead area.

Project No. 2. Apple Tree Anthracnose. The work on this project has been largely a continuation of previous work. It seemed desirable to confirm all previous results obtained and to carry on a large series of inoculations. This work is in preparation at the present time. This disease has been found on the pear and some study of this made. The perfect stage was also found upon the pear. The disease, as it occurs upon quince, has received some attention. The study of a fruit rot and twig blight is in process. Recently a large series of cultures have been obtained, some from the perfect stage on both apples and Winter Nelis pear, and the conidial stage from apple branches, apple fruit, pear seedlings, Winter Nelis branches, quince fruit and the twigs. It is proposed to carry on a large series of inoculations on apple and pear to determine absolutely whether the forms are all the same.

HATCH INVESTIGATIONS.

Only a small allotment from the Hatch Fund has been available during the year by this department. This has been used entirely for salaries and has been considered as supplementary to Adams and Crop Pest work.

CROP PEST INVESTIGATIONS.

No. 1. Potato Diseases. Potato diseases have received special attention. Several diseases have been under observation, including certain diseases caused by species of *Fusarium*, the Silver Scurf,—a disease to date not reported in the west,—*Rhizoctonia*, scab, etc. The principal work has been on the late blight, which, in the fall of 1912, was very serious in the State and caused a great deal of damage. Important observations made on this disease, developed the fact that it also attacks tomatoes, producing rot of the fruit as well as a blight of the leaves.

During the season of 1913 spraying experiments for the control of the blight have been conducted at Clatskanie on the 16-acre field belonging to John Cheldelin. A similar experiment was also conducted by John Miller in an adjoining field of twenty-two acres. Bordeaux mixture was used. The first application was made July 11, the second, Aug. 7, and the third the later part of August. The 4-4-50 formula was used in the first two sprayings, and 6-6-50 in the last. The results of the spraying experiment were very conclusive, since the blight appeared in the fields

early in September, and the plants which had not been sprayed were soon completely destroyed, while those which were sprayed were still alive and vigorous. Many potatoes were found rotting in the ground at picking time on the unsprayed plots, but such tubers were very rare where spraying had been conducted.

No. 2. Brown Rot of Prunes. Spraying experiments were conducted in the orchard by Mr. Z. L. Chamberlain at Newberg. The crop was very light in this orchard and very little brown rot developed, so the results of the experiment were inconclusive, but indicated the benefit of spraying.

No. 3. Mushroom Root Rot. Considerable field work on this disease was conducted. The disease was found upon the apple, cherry, peach, prune, rose, oak, walnut, etc. Pure cultures were obtained from many of these hosts. Some study was also started on cultures originating from mushrooms on fir, maple, etc., to determine whether the fungus which attacks the fruit trees is the same as that which occurs native upon forest trees. Some inoculation work has also been done. Observations on combative measures show that the recovery from attacks of this disease have been made in well-authenticated instances by surgical methods on apple trees accompanied by the exposure of the base of the trunk and main roots.

No. 4. Rust of Pear and Quince. A rust of pear has occasionally been reported from Oregon for a number of years past, though it is usually not considered serious. This was reported for the first time on quince in the summer of 1912. In this instance nearly 50 per cent of certain trees were affected. In the spring of 1913 this disease broke out in epidemic form and caused a great deal of damage to pear and quince trees. It very rarely occurs upon the apple. Studies of this disease seem to indicate that it is probably the same as the one which occurs upon native pomaceous hosts, notably service berry and hawthorn. It has been shown that the rust which occurs upon the native hosts is connected with a rust which occurs upon cedar. No proof has as yet been found that the pear and quince are genetically connected with cedar rust, but it is thought that this is true.

No. 5. Crown Gall. Experiments have been conducted during the past biennium on crown gall of peaches at Ashland. This work has been an attempt to control crown gall after it gets a start in an orchard. While it is too early to obtain final results, indications are that the work was more or less successful. An extensive experiment is being conducted in cooperation with the Oregon Nursery Company at Orenco. This consists in comparisons of the growth of trees which are affected with crown gall and hairy root at planting time with others which are healthy.

DEPARTMENT OF ENTOMOLOGY.

ADAMS INVESTIGATIONS.

Project No. 1. Scolytidae infesting the Douglas Fir. *Pseudotsuga taxifolia* (Pow) Britt. The following general phases of the work have taken up most of the time allotted to this work:

1. Present status of this or related problems—a review of all the literature thereon.
2. A systematic study of the group. The accumulation of a collection.
3. A study of forestry and lumbering methods, and their possible bearing on the problem.
4. The number of species concerned. Their distribution in Oregon.
5. Effect upon the tree; part attacked, symptoms of attack.
6. Life-history and biology.

Project No. 2. Red Spider Investigations. Work in color variations completed. Systematic work pursued. Value of the characters of the genital armature discovered and used. Four new species, all of economic importance, found. Three described. Key to males published. Slides from Washington examined and notes and drawings made. Work on natural enemies continued. Several new natural enemies found, including a gamasid mite, a Bdellid, a species of *Rhyncholophus*. Notes and drawings made of previously known natural enemies. Some of the stages in the life-histories of natural enemies determined. Geographical distribution work started. Map of United States made for showing distribution of each species. Drawings made of several species of red spiders. Notes on seasonal history continued, also those on habits. Control measures tried as follows: Fumigation, evaporation of sulfur, spraying with several kinds of sprays against spiders on hops, pears, violets, tomatoes, and melons, and some other plants. Cause of infestation and methods of its prevention studied. Nature of injury studied. Samples obtained, photographed, and mounted. (Station Bulletin 121.)

HATCH INVESTIGATIONS.

No. 1. Introduction of Beneficial Insects into Oregon. Interesting data of more or less value have been secured in connection with the Coccinellidae (Ladybird beetles). Notes on migration and hibernation were made and the life-histories of two different species have been worked out. Statistics have been taken on the abundance of different species, as well as upon the different insects that serve as hosts of these enemies. *Megilla maculata* (the common eastern Ladybird beetle), a very abundant species in the East, has been introduced and is being reared in confinement. Specimens will be liberated when they become acclimated. A study of some new enemies of stored grain has been made. Recently a shipment of codling moth parasites (*Calliephialtes messor* Graves) from California has been received, and an effort will be made to establish this insect in Oregon.

AGRICULTURAL EXPERIMENT STATION

CROP PEST INVESTIGATIONS.

The Shot Hole Borer (*Xyleborus dispar* Fab), Brown Apple Aphis (*Aphis sorbi* Kal) and the Strawberry Root Weevil (*Otiorhynchus ovatus* Linn.) were selected for primary investigations. In addition to these, as time and circumstances would permit, a number of less important insects have been studied. The results of the investigations, supplemented by other data previously in the department files, have been published in the Biennial Crop Pest and Horticultural Report for 1911-12.

A number of minor problems studied during the past two years are now being studied as major problems and it is the intention of the department to take the following problems and work them out one by one:

1. The introduction of beneficial insects into Oregon.
2. Combination sprays: To determine practicability of combining lime-sulfur with arsenate of lead, arsenite of zinc, and "Black Leaf-40" for control of insect pests and plant diseases, in cooperation with the department of Plant Pathology.
3. Life-history and control methods of the Woolly Apple Aphis (*Eriosoma lanigera*).
4. Life-history and control methods of the Fruit Tree Leaf Beetle (*Synota Albida*).
5. Life-history and control methods of the Bud Moth (*Tmetocera ocellana*).
6. Life-history and control methods of the Cherry Fruit Fly (*Rhagoletis cingulata*).
7. Vetch and Pea Aphis (*Macrosiphum pisi*).
8. Continuation of studies on the control of the Strawberry Root Weevil (*Otiorhynchus ovatus*).
9. Life-history and control (preliminary) of Strawberry Root Miner (*Aristotellia* sp.)
10. Continuation of studies of poison sprays for the control of the Currant Fruit Fly (*Epochra canadensis*).
11. Life-history studies and control measures of the Cucumber Beetle (*Diabrotica soror*.)
12. Studies in the life-history and control of the Clover and Alfalfa insects.

Insecticide and Fungicide Investigations. In cooperation with the department of Botany and Plant Pathology.

The following are the summarized notes of results of this investigation:

1. Lime-sulfur 29.5 degrees Be (1-30) plus acid arsenate of lead, 2 pounds to 50 gallons, did not cause any more spray injury to foliage and fruit than did the lime-sulfur and neutral (spray injury quite bad on Newtown and Ben Davis). Injured fruit worst on south side of trees and in direct rays of sun.
2. Lime-sulfur 29.5 degrees Be (1-30) plus arsenite of zinc, 1 pound to 50 gallons, (two different brands) caused very little injury to foliage and except in the case of Ben Davis did not cause any more injury to

the fruit than was found on unsprayed trees. (Ben Davis suffered badly.) The injured fruit on these trees was worse on south side of tree.

3. Injured apples similar to those on the sprayed trees could occasionally be found on unsprayed trees in the check plots, but the difference in percentage was so great as to warrant the conclusion that the injury on the sprayed trees was in some way due to the action of the spray.

In 1912 a series of experiments was started upon the decomposition of combined sprays when allowed to stand. The materials in each case were kept in corked bottles and examined from time to time during the following year. Apparently no further change occurred and each combination retained its characteristic odor. An examination June 1, 1913, gave the same conditions, and tests for the insecticidal value showed them to be apparently as efficient as freshly prepared materials.

The arsenates of lead used in these experiments were especially prepared by the Station chemical department and were theoretically pure.

The fungicidal value of the following experiments was not considered.

To determine the effect upon apple foliage of the above chemicals alone and in combination, a series of experiments was conducted as follows: In a block of 20 Newtown apple trees, each tree was used for one spray. Applications made June 16, 1913.

Ex. No.		8 lb. to 100 gals. water	
1.	Arsenate of lead (acid)	4	" " " " "
2.	" " " " "	2	" " " " "
3.	" " " " "	8	" " " " "
4.	" " " (non-acid)	4	" " " " "
5.	" " " " "	2	" " " " "
6.	" " " " "	8	" " " " "
7.	Arsenate of zinc	4	" " " " "
8.	" " " " "	2	" " " " "
9.	" " " " "	8	" " " " "
10.	Arsenate of lead (acid)	4	" " " " "lime-sulfur 1-30
11.	" " " " "	2	" " " " " " " "
12.	" " " " "	8	" " " " " " " "
13.	" " " (non-acid)	4	" " " " " " " "
14.	" " " " "	2	" " " " " " " "
15.	" " " " "	8	" " " " " " " "
16.	Arsenate of zinc	4	" " " " " " " "
17.	" " " " "	2	" " " " " " " "
18.	" " " " "		
19.	Water without chemicals		
20.	Lime-sulfur, 30.5 degrees Be. 1-30		

These trees had not been previously sprayed, and the leaves were more or less affected with scab. The orchard had only been cultivated once and therefore was in prime condition to give results in an experiment of this character. The two days following varied from rain to sunshine, mostly rain.

Summary of Results.

Lime-sulfur plus arsenite of zinc; lime sulfur plus arsenate of lead (acid); and lime-sulfur plus arsenate of lead (non-acid); in all strengths caused serious burning. If anything, the non-acid injury was slightly the worst. Lime-sulfur caused considerable injury, but not one-half as much as in the combination sprays.

Arsenite of zinc alone and in all strengths caused considerable burning. The burning was different, however, from that of the combination

and lime-sulfur sprayed trees. With the combination sprays, the entire leaf was destroyed or else the injury covered a distinct portion, all parts of which were discolored. Scab spots on the leaves appeared black, ordinary leaf tissue brown.

With the arsenite of zinc, only the scab spots were injured. In a few cases entire leaves were blackened or browned. The majority of the injured leaves were spotted with injury. Each one of these spots was determined to be the seat of germination of a scab spore. The leaf tissue, between and surrounding these spots, did not appear to be injured.

Arsenate of lead (acid) and arsenate of lead (non-acid) did not cause injury in any case when used alone. In experiments with arsenite of zinc, etc., where injury did occur, the injury did not begin to show up badly for about five days, when suddenly, over night, it appeared at its worst. The check trees, sprayed with water, did not show injury.

As soon as the injury on trees sprayed with arsenate of lead (non-acid) became apparent, checks were made on trees 10, 12, 13, 15, 16, and 18. The utmost care was used in these applications, and as the same injury occurred a second time, we must conclude that even with the purest of chemicals, lime-sulfur plus arsenate of lead is not a stable spray under northwest conditions.

The controlling factors are yet to be determined. Two other experiments for the control of the codling moth have not yet been finished. But in one of these, lime-sulfur plus arsenates of lead (acid and non-acid), and arsenite of zinc, did not cause more than slight injury at the first application. The second application on June 30 caused serious injury. Therefore we may say that the above combination sprays are safe for the calyx spray, but are unsafe at the time of the second codling moth spray.

Recent Insecticide Investigations.

1. To find the value of lime-sulfur as a stomach poison.
2. To find the value of arsenate of lead (acid) as a stomach poison.
3. To find the value of arsenate of lead (non-acid) as a stomach poison.
4. To find the value of arsenite of zinc as a stomach poison.
5. To find the value of arsenate of lead (acid) plus lime-sulfur as a stomach poison.
6. To find the value of arsenate of lead (non-acid) plus lime-sulfur as a stomach poison.
7. To find the value of arsenite of lead as a stomach poison.

The chemicals used were secured from the same source as those used in the spray-injury experiments.

Larvae of the tent caterpillars, *Lalacasoma erosa* and *Malacasoma pluvialis*, were used in these experiments and were placed on sprayed twigs in the open part of the insectary. Newspapers were placed under each of the twigs to catch the dead larvae and every experiment kept separate from the rest.

Summary of Results.

Arsenite of zinc is a quicker-acting poison than arsenate of lead, acid or non-acid, and remains in suspension much better. Acid arsenate of lead is a quicker-acting poison than the non-acid and remains in suspension better. Non-acid arsenate of lead is slow in its action, but is satisfactory in that death finally occurs.

Lime-sulfur in the experiments conducted has not proved to have much value as a stomach poison. Lime-sulfur with arsenicals seems to retard to a more or less extent the action of the poison and it is possible for larvae to feed on foliage sprayed with weak strengths of lime-sulfur plus arsenate of lead and recover, if transferred to fresh foliage within a few days.

Very young caterpillars placed on twigs freshly sprayed with lime-sulfur 1-30 died within two or three days, but as they did not feed, death must have resulted from the gases given off. Very young caterpillars placed on twigs that had been sprayed with lime-sulfur 1-30 and allowed to stand, refused to eat and finally died from starvation. Half-grown larvae placed on twigs sprayed with lime-sulfur did not feed as did the larvae on unsprayed twigs, but did eat to some extent. After two weeks on lime-sulfur sprayed twigs, they were transferred to freshly sprayed leaves and finally matured, pupated, and emerged in the adult stage.

Lime-sulfur probably acts as a repellent to biting insects in the same way that Bordeaux does against the potato flea beetles. Lime sprinkled or sprayed on the foliage in the same proportions as found in a certain amount of lime-sulfur has no effect.

DEPARTMENT OF CHEMISTRY.

ADAMS INVESTIGATIONS.

Hop Investigations. A study was made of the chemical changes in the hop due to "sulfuring" (the common treatment with sulfur dioxide fumes). The results obtained from the investigations showed:

1. That there is nothing to indicate that sulfuring in the bleaching process affects the bitter resins. The resin of the "sulfured" hop contains no sulfur.
2. That the sulfur dioxide does not combine with the essential oil of the hop.
3. That the "unsulfured" hop contains sulfur in the sulphate form but no sulfur which is volatile by the ordinary steam distillation.
4. That different samples of "sulfured" hops contain different amounts of sulfur, both total and volatile with steam. There seems to be no definite proportion between the volatile sulfur and the total sulfur.
5. That the amount of sulfur present in the unsulfured Oregon hop is practically constant.
6. That the analytical methods which have been in use for the estimation of the amount of "sulfuring" are unreliable.

7. Methods for determining quantitatively the different forms in which sulfur is found in the "sulfured" hop have been worked out.

The hop seed when ground yields an ether extract amounting to approximately 25 per cent of its weight. This extract contains a drying oil which resembles linseed oil in some of its properties.

An experiment designed to show the chemical changes taking place in the hop during storage has been carried on since October 31, 1912. Samples have been taken every two months until the present time. All the samples taken have been analyzed. The results as yet are incomplete.

Chemical Spray Investigations. The work on this project during the biennium has been a study of the different arsenates of lead. The most significant results of the work completed thus far are as follows:

1. Lead hydrogen arsenate (lead "acid" arsenate) has been prepared in the pure form. The work done indicates that this compound has not been successfully prepared in its pure state previous to this time.
2. All attempts to prepare ortho arsenate (neutral lead arsenate) have failed. In fact, the work shows that this compound, which has been thought by previous investigators to be one of the constituents of commercial lead arsenate, does not occur in this material.
3. A new arsenate of lead has been prepared. This is a basic arsenate which evidently is the principal constituent of the commercial "neutral" arsenate of lead.
4. A pure pyro arsenate of lead has been prepared.
5. An analytical method for determining the amount of lead hydrogen arsenate (lead "acid" arsenate) in mixtures of this compound with the basic lead arsenate, has been developed. This method is a decided step toward the accurate valuation of commercial samples.
6. In cooperation with the department of Entomology, experiments have been carried out on the actual insecticidal value of the different lead arsenates. The results obtained show that lead hydrogen arsenate has much greater killing powers than the basic arsenate.

Soil Bacteriological Investigations. This work has been carried on cooperatively with the department of Bacteriology. Nearly 500 chemical determinations have been made in this work. Six distinct types of Oregon soil have been studied. The work thus far has been a comparative study of the ammonifying, nitrifying, and denitrifying efficiency of the different types and the effect of the application of lime upon these powers.

Lime seems to have a marked effect upon the soils of Western Ore-

gon, showing a marked increase in ammonifying and nitrifying efficiency. The effect on the soils of Eastern Oregon is not so noticeable.

Incubation Investigations. A small amount of work has been done, the results of which are as yet incomplete.

HATCH INVESTIGATIONS.

Investigation of the Composition of Oregon Forage Crops and Grains. A small amount of work has been done. The arrangement of the work of the laboratory was such that not much time could be devoted to this subject.

Soil Analysis. This has been a continuation of the work already in progress. Representative samples of the different types of soil occurring in the Hood River Valley were analyzed. These samples were selected by the experts who made the soil survey of that county for the Bureau of Soils, U. S. department of Agriculture. The analyses of these samples revealed a grave nitrogen deficiency in many of the soils of that region. Some deficiencies in potash and lime were also found.

Fertilizer Control Work. Samples of simple and mixed materials have been collected from the market and analyzed. Practically no violation of the State fertilizer law has been found. The commercial brands of fertilizers now sold on the Oregon market have been licensed in accordance with the law.

Miscellaneous Work. This includes the various routine determinations which have been made for residents of the State. The samples examined consist mostly of feeding stuffs, mineral waters, and insecticides and fungicides. Practically all of the different brands of arsenate of lead, arsenite of zinc, and lime-sulfur solution now being sold on the market have been analyzed.

DEPARTMENT OF BACTERIOLOGY.

ADAMS INVESTIGATIONS.

A Study of the Activities of Oregon Soil Bacteria. The preliminary work has been done in this study and considerable time has been spent on the various problems of nitrogen fixation, ammonification, denitrification, and cellulose digestion. In cooperation with the department of Chemistry 500 routine determinations have been made.

HATCH INVESTIGATIONS.

During the spring, summer, and fall of 1912, records show that 315 cultures of bacteria for the inoculation of legumes were sent out by the department. This was a growth of over 100 per cent in advance of the year preceding. During the spring and summer of 1913, 620 cultures of this class have been sent out, showing an increase of 97 per cent over the culture distribution of 1912. Culture blanks were sent out in October, 1912, requesting that the results obtained, whether favorable or unfavor-

able, be reported to this office and a careful compilation of the reports sent in shows that direct benefit was derived in 69 per cent of the instances where the culture was used. This record is particularly good when it is considered that the soils in Western Oregon tend toward acid reaction, which condition is unfavorable both to the growth of such a crop as alfalfa and also to the micro-organisms necessary to inoculate the roots of the crop. In the eastern part of the State, in the semi-arid region, soil conditions are decidedly dry and there is considerable alkalinity. Both of these conditions; namely, dessication and the presence of an abnormal amount of acid or alkaline salts, are unfavorable to the life and activities of the seed inoculation organism, *B. vadicicola*.

Table II indicates the number of cultures sent out for each crop:

Table II. Number of Cultures of Bacteria for Inoculating Legume Sent Out for Each Crop, with Aggregate Acreage.

Crop	No. of Cultures	Acreage in Aggregate
Alfalfa	164	1008.50
Red clover	51	407.75
Alsike clover	5	15.75
White clover	3	4.00
Vetch	18	232.50
Garden peas	34	65.25
Garden beans	33	36.00
Canada field peas	4	13.25
Soy beans	2	1.25

Miscellaneous Investigations and Examinations. The general routine work of the department shows a large increase. Many specimens have been examined, consisting of water samples, submitted for sanitary examination by farmers and other citizens, human blood, chickens, faecal matter, hog tissue, milk and cream, pus, sputum, swabs, human tissue, human urine, vomitus, dog brains, turkeys, insect larvae, and bread crumbs.

A good deal of work of a laboratory nature has been done with chickens and other poultry. Avian tuberculosis is the disease most often met with in this connection. Certain lesions of peculiar and rather abnormal character have been found in chickens infected with this disease in this State. Not always are the tubercles fatter or calcarous, but sometimes they prove to be less firm, although the tissues do not show traces of breaking down, and are hardly at all fatty. Lesions of this character appear to be found more often in the mesentery. In these cases the liver, which ordinarily is the tissue first attacked, seems to be comparatively free.

An investigation will be made of eggs from the College flocks and from flocks in the vicinity for the detection of possible carriers of the disease of young chickens known as "White Diarrhoea," the infecting form being *B. pullorum*. It is also desirable to examine the ovaries of possibly infected hens. Already a number of such birds have been found, and it is thought a decided benefit can be rendered to the poultry industry by such examination for the production of uninfected stock.

DEPARTMENT OF ANIMAL HUSBANDRY.

HATCH AND STATE INVESTIGATIONS.

Experimental Feeding of Swine.

The experimental work with swine has been fattening for market; testing the efficiency of the self-feeder for that purpose; and testing the relative efficiency of tankage and skim milk as adjuncts to barley. Equal nutrients rather than financial values from these two sources, were tried out in determining the requirements for producing 100 pounds of pork.

Experiment 1. Tankage vs. Skim Milk as supplemental Feeds. Initial weight, Lot 1, 675 pounds; Lot 2, 635 pounds. Weight at conclusion of experiment, Lot 1, 1344 pounds; Lot 2, 1243 pounds. Feed consumed for 100 pounds gain, Lot 1, 271.9 pounds barley and 631 pounds skim milk; Lot 2, 331.1 pounds barley and 35.11 pounds tankage. Cost of 100 pounds gain, Lot 2, \$5.84. Value of skim milk for each 100 pounds gain in Lot 1, as compared with Lot 2, \$28.29.

In the above table barley is estimated at $1\frac{1}{2}$ cents a pound, tankage at $2\frac{1}{2}$ cents. It will be noted that the cost of gains are low considering the cost of feed. On barley alone and assuming 450 pounds barley required for each 100 pounds gain, the cost of this gain would have been at least 90 cents greater, in comparison with which prices skim milk returns a value of 28.2 cents for each cwt.

Experiment 2. Self-Feeder vs. Hand-Fed. Lot 1, Self-Feeder, Lot 2, Hand-Fed. Feed required for 100 pounds gain, Lot 1, 512.2 pounds and Lot 2, 488.3 pounds.

Both lots received the same ration; viz., crushed wheat 5 parts, shorts 4 parts, tankage 1 part. The ration fed to the hand-fed was soaked twelve hours prior to feeding; that of the self-feeder was fed dry.

Experiment 3. Self-Feeder vs. Hand-Fed. In the second trial of the self-feeder a marked advantage in favor of the self-feeder lot was obtained. Since, however, the self-feeder ration was fed dry and the hand-fed ration was soaked twelve hours before feeding, a check on the effect of soaking is to be run in a subsequent experiment. Lot 1, hand-fed, Lot 2, self-feeder; feed for 100 pounds gain—Lot 1, 536.7; Lot 2, 417.9 pounds.

From the above summary it will be seen that the self-feeder lot ate more feed daily and gained more rapidly at a small cost of nutrients than did the hand-fed lot.

Experiment 4. An Experiment to determine the Cost of Production. Two Duroc Jersey sows, with nine seven-day-old pigs each, were purchased. The sows were estimated at \$20.00 each, the pigs at \$3.00 each. This is assuming an abnormally high birth cost, but in lieu of a more accurate one, this is accepted, it being the price at which the pigs were purchased. The fifteen pigs grown consumed from April 1 to August 15, 3,436.3 pounds of mill feed and the sows during the time of suckling the pigs consumed 1220 pounds, representing a total value of \$122.68 or \$8.74 for each hundred pounds of live weight of pigs. The ration con-

sisted of wheat 5 parts, shorts 4 parts, and tankage 1 part. Tankage was estimated at \$45.00 a ton, wheat \$26.00, and shorts \$30.00. Assuming a birth cost of \$1.50 each for the pigs, the cost of production would be reduced to \$6.81 for each hundred pounds.

Experiments with Sheep.

Experiment 1. To determine the Practicability of utilizing cull Ewes for the Production of early Market Lambs. Twenty cull ewes, some of them quite old, were selected. These were fed during the winter, in an open yard with shed. Owing to a total lack of pasture large quantities of hay and grain were required to maintain the ewes in good condition. The lambs came at irregular intervals and so were marketed at various times. Thirteen were sold at Easter time as hot-house lambs and brought a good price. The remaining seven were not sold until the end of June. Those sold for the Easter trade averaged about 40 pounds live weight, while those sold in June averaged over 70 pounds, but they brought approximately the same price a head. Two of the ewes died during the experiment, but considering age and character of the stock such a loss could not be considered abnormal.

Cost of ewes, \$82.42; cost of feed, \$149.68. Sale of ewes, lambs and wool, \$191.51. Loss, \$40.59.

Experiment 2. Shelter Test. The object of this test was to determine the advisability of keeping lambs under shelter during the winter. Eleven lambs were selected from the College flock and divided into uniform lots by the "pairing" system. The one odd lamb (Cotswold) was placed in the inside pen. Lot 1 were allowed the run of the entire farm and were fed in trough and racks in the open field. Lot 2 was kept in a shed with access to a small outside yard well bedded with straw. With the exception of the odd lamb in the pen, all the lambs were thrifty.

Average gain for each lamb during the experimental period from December 3 to March 4, Lot 1, 27.75 pounds; Lot 2, 23.25 pounds.

While this test is too small to justify any definite conclusions, the results indicate that from the standpoint of the rate and economy of gain, those under shelter did much better during the rainy season, but that the best results of all were obtained from those outside during the good weather.

POULTRY HUSBANDRY DEPARTMENT.

ADAMS INVESTIGATIONS.

Incubation Investigations. The problems of incubation and rearing of the chicks are thought to be more intricate and difficult than any other in poultry keeping. The main purpose of this investigation is to learn, if possible, the cause of the loss from eggs that fail to hatch and the mortality of chicks. In cooperation with the department of Chemistry much interesting experimental data have been secured. Experiments on the influence of different degrees of humidity, both as it relates to the incubation of the egg and the vigor and subsequent growth of the chick, have brought out some important results, both from the practical and

chemical viewpoint. It has been shown that the humidity surrounding the eggs during incubation has a highly important function to perform. This, taken in connection with ventilation of the incubator and the supply of oxygen, is probably the factor to be reckoned with in solving the problem of losses in connection with the hatching of chickens. Considerable data have been secured relating to the amount of carbon dioxide in incubators and under hens, and as to its function in incubation. A series of determinations has been made showing the effect of different degrees of humidity and ventilation on the chemical composition of the chick.

HATCH AND STATE INVESTIGATIONS.

Under the funds of these investigations, the work in breeding for high egg production has been continued. The results of this breeding work have been very encouraging and show conclusively that it is possible by selective breeding to increase egg production. Records since the work commenced, some five years ago, show an increase in yield each year. There is now a good-sized flock of layers with pedigrees dating back three years, and in some cases four years, from stock that laid 200 eggs a year or more.

The purpose of the work was in the first place to determine, or demonstrate, whether or not high egg-laying is transmitted from parents to offspring, and if so transmitted, what method of breeding should be followed by practical poultry breeders to secure the benefit of a higher egg yield.

In this work there has been used each year a flock of some 400 pullets and hens of two breeds of chickens, the Barred Plymouth Rocks and the White Leghorns. These breeds have been bred separately and breeding stock has been selected from them on the basis of their trap-nested egg records, covering from one to four years.

Another method has been followed, that of crossing the two breeds mentioned to determine what effect crossing has on egg yield and on vigor, and to ascertain whether high egg yield could not be more quickly achieved by developing a new strain or variety.

In connection with this primary object, it is thought that there is a demand for a type of fowls having, in the first place, high egg-laying as a fixed characteristic, and, in the second place, better meat qualities than the Leghorn. The Leghorn, on the one hand, is not a good market bird, and the Plymouth Rock, on the other hand, while a good market fowl, is too large for the general consumer. It is thought possible to add a little to the meat qualities of the Leghorn as well as to its egg production. With a type of chickens weighing from four to five pounds, the consumption of poultry will be very greatly increased. Results show that this ideal is within reach; that is, the egg records show a much higher yield than the average of either the original Plymouth Rocks or the Leghorns, while the meat quality is also such as better to meet the needs of the great body of consumers.

DEPARTMENT OF AGRONOMY.

HATCH AND STATE INVESTIGATIONS.

Rotation Experiments.

1. **Rotation of soil crops** for the continuous production of green feed throughout the year under Western Oregon conditions.

Results show, as heretofore, the possibility of maintaining, by means of the rotation advocated, a milking cow throughout the year upon every acre of average good Western Oregon land, and furnishing a continuous supply of green feed cut from the field every day in the year, thus permitting the most intensive sort of dairy farming. Under this system of cropping, it is possible to obtain a profit of from \$50 to \$100 an acre from land handled in this way devoted to dairying, with careful utilization of the by-products—the skim milk for the pigs and manure for increasing fertility. Under this plan the rotation is about as follows:

Vetch and rye from April 15 to May 15.

Vetch and oats and clover from May 15 to July 15.

Corn silage from July 15 to August 15 or September 1.

Corn (green) from September 1 to October 15.

Kale and mangels, and if desired, silage, from October 15 to April 15.

The use of silage for midsummer is rather a novel practice, but highly successful here, and more needed indeed at that season than in midwinter, the time when silage is generally used elsewhere.

New trials of soiling crops undertaken were mixtures of cereals and vetch compared with cereals alone and vetch alone. The cereals alone gave both poor yields and poor quality for soiling purposes, while the mixture of cereals and vetch proved the best in varying degrees, according to the mixture. One of the seedings of rye and vetch yielded 10.3 tons of green feed to the acre. Crimson clover gave 10 tons of green feed to the acre, immediately following the vetch and rye.

2. **Fertility rotation.** To get the large block of plots required for this experiment into a uniform state of fertility, it was necessary to crop the plots as uniformly as possible throughout, in the effort to get them equalized, so that these experiments when they are started will give conclusive results.

3. **Experiment with Legumes.** The variety trial of vetches to determine the best seed producers was not continued. The seed is in storage and the experiment will be continued as soon as conditions permit. The trial of vetches as forage producers is considered practically concluded, the smooth vetch (*Vicia sativa*) common to all Western Oregon, having proved itself without question superior to all other varieties for Western Oregon conditions.

Variety trials with field peas; breeding of *Vicia sativa* for high protein content, and the propagation and maintenance of alfalfa under Western Oregon conditions have been temporarily discontinued.

4. **Soy Beans.** The variety test of soy beans has given some promising results. The first trials were rather discouraging, but the later results have been a good deal better. Two varieties, the Chernie and Tashing, matured well, as did some of the selections from the previous year.

Experiments with Cereal Crops.

1. **Breeding of corn** for grain and forage production under Western Oregon conditions. Forty-four varieties have been tested, and as heretofore the Experiment Station selections of Minnesota No. 13 were best silage and forage producers, while selections of Minnesota 23 were the best grain producers. The second-best forage corn, as heretofore, was the Northwestern Dent, while Early Bird and Brown County Yellow Dent also gave excellent results.

The second-best grain producer was the Dakota Sunshine. As previously, ear-to-row tests of both the Number 13 and Number 23 were continued. From the Station No. 23, yields ranging from 34 to 85 bushels an acre were obtained. From the Station No. 13, silage yields running from 7.4 tons to 22.1 tons an acre were obtained.

2. **Variety Test of Cereals.** The variety test of winter grains was suspended. Thirteen varieties of spring oats were planted, the yield ranging from 33 to 50 bushels an acre. The leading varieties were Dow's Pedigree Banner, Improved American, Widmer Three-Grain, Shadeland Challenge, and Shadeland Climax.

Of the spring barleys, twenty-three varieties were tested, ranging in yield from 15 to 35 bushels an acre. The leading varieties were Number 19785, 19786, Oderbrucker, Common Beardless (Wertz), Wisconsin No. 6, and Wisconsin No. 13.

The best yielding and best quality of spring wheat was obtained from the Pedigree Red Fife.

Kale-Breeding Experiment. For the second time the much-advertised marrow cabbage was compared with the selected thousand-headed kale, but the latter proved decidedly superior and further test of the marrow cabbage is considered unnecessary.

As heretofore, a number of selections of kale were made, inferior plants were destroyed in the seed plots, and a high quality of seed produced. The Station kale seed is in wide demand throughout Western Oregon, as hundreds of cooperative trials in every section have demonstrated it to be superior to common seed.

Potato-Breeding Experiments. The variety trial included twenty-seven varieties and a considerable number of selections. The leading varieties so far are the selected Burbank, Bovee, and Gold Coin.

Experiment to determine the Value of Irrigation to Western Oregon Crops, such as Clover, Alfalfa, Corn, Mangels, Kale, etc. Six years' data are available on eight different field crops, together with weather records and the results of several thousand soil-moisture determinations. Determination of moisture content of the soil and the evaporation from the water surface have shown themselves to be valuable guides as to the best time to irrigate. The results show that potatoes make a maximum

yield if irrigated when the moisture content drops to twenty per cent in the first foot of soil, while with clover the most economical returns are had when it drops to fifteen per cent in the first two feet. The most economical returns for each unit of water applied have been secured from very light irrigations applied to soils of high fertility. Three 1-inch irrigations for potatoes gave 29 bushels for each acre inch. The effect of irrigation on the quality of potatoes was determined, showing no distinct effect as to edibility but a decided increase in the percentage of marketable potatoes where irrigation was used. Over-irrigation on the other hand caused an equally marked decrease in marketable quality.

A careful study of the effect of irrigation on the soil itself shows that with careful handling as to crop rotation, cultivation, and judicious use of water, the quality of the soil may steadily be improved, but with careless handling the quality may be greatly injured.

Using one dollar, which the data show is the maximum total annual cost for each acre inch, corn has given an average profit of 50 cents an acre inch, kale 75 cents, beets \$1.18, alfalfa \$1.75, beans \$2.86, clover \$2.87, carrots \$3.74, and potatoes \$7.63 for each acre inch of water applied. The mean profit for each acre inch as an average of all crops and including nearly 150 trials, has been \$2.33. The average increase in yield by crops has been 54 per cent and the average depth of irrigation for each season 4.8 inches.

It is safe to say that this experiment proves conclusively that irrigation may be successfully and profitably practiced on those soils of the Willamette Valley which are well drained and properly managed as to rotation, cultivation, and limited use of water, particularly for such types of farming as intensive dairying, truck gardening, and hop growing.

A new test was started to determine whether electricity or gasoline is the better fuel for pumping. Although the gasoline proved somewhat cheaper for the actual cost, the saving of labor effected by electricity made this method the better of the two.

Rice-Growing Experiment. A test was undertaken to determine the practicability of growing rice under local conditions. All of the hardiest varieties which were furnished by the U. S. department of Agriculture were tried and all started well, but only a few plants in the entire lot got so far as heading out, and not a grain matured.

DEPARTMENT OF DAIRY HUSBANDRY.

Owing to the vast amount of work in dairy investigations which has been done by other experiment stations, thus in a measure restricting the field for technical work without duplication of effort, it was thought best to confine the work of this Station to the study of more local problems.

1. **Silage and Kale Feeding.** The use of kale as a winter forage crop is a very common practice in Western Oregon. The large yields, palata-

bility, and high protein content of the plant make it a most desirable forage. But there is much complaint over the matter of harvesting the crop in all sorts of winter weather, and of the resultant effect on the soil. Besides, the high protein content of the plant, when fed in conjunction with other highly nitrogenous plants, gives a ration containing an excess of protein. Some progress has been made with this investigation, but sufficient data have not been secured to warrant conclusions.

Soiling experiments have been continued, and it is contemplated to undertake an investigation of incomplete as compared with complete soiling systems. It is generally recognized that the soiling system is essential to the highest success on high-priced lands, but it has not been proved that the best results in milk and fat production with the individual cow can be obtained year after year under the complete soiling system.

2. Advanced Registration. The testing of dairy cows for advanced registration is supervised by the various experiment stations in the states where the animals tested are located. During the year 1912-13 the time of one man has been practically all occupied with this work, and considerable additional time of special testers has also been required. While all expenses of the tester are met by the parties for whom the work is done, considerable time is required in checking and verifying the tester's figures. Ten breeders of Jerseys have been testing for yearly fat estimates, and four Holstein breeders have made seven-day tests during the year.

3. Grade Herd Investigations. Cooperative work has been taken up with three different owners of good grade herds. Tests of these animals are made monthly and the owner keeps daily records of milk production, as well as data on amount and value of feed.

BRANCH EXPERIMENT STATIONS.

Burns Station. This farm is thoroughly established, with modern buildings and good equipment for work. The present year, being the first season, has been devoted to summer fallowed land under different methods of cultivation. Forty to fifty plots, however, were seeded, largely with the idea of showing the futility of attempting to secure a crop without the storage of a year's moisture. Yields of grain running from five to fifteen bushels were obtained, but in the main it was demonstrated that summer fallowing was necessary before a profitable crop could be grown. Eleven different varieties of the hardiest strains of alfalfa that could be found were seeded and showed conclusively that the most frost-resistant and the most vigorous variety was the Baltic. The Grimm proved to be the second best.

In the fall of 1912, summer fallowed land was seeded to all varieties of winter crops, and full experimental work started at that time. The following spring, all spring varieties, including a very large trial of field peas, were planted, and further extensive seedings of alfalfa were made. Plantings on the eight substations throughout Harney county have been

started and a number of cooperative trials with farmers have been inaugurated.

One of the most remarkable results obtained at the Burns Station this year is the effect of the cultivation methods employed for moisture conservation and the deep storage of moisture. Practically all Central Oregon is underlaid at a depth of twelve to eighteen feet with a water-carrying strata. To farmers in that section has been suggested the possibility, by careful conservation of the precipitation, of bringing the surface moisture in conjunction with the capillary moisture rising from the water table. Borings have been made throughout the year and a number of wells dug purposely to observe this moisture movement. These examinations revealed the fact that on more than fifty per cent of the 200-acre farm, where thorough cultivation has been given, the surface moisture has already joined the moisture from the water table, while in the remainder of the farm, as a result of tillage methods, the two moisture areas are rapidly drawing closer to each other. This phenomena will practically convert a dry farming area into a sub-irrigated area. Since it is estimated that there are about 2,000,000 acres of tillable land in Central Oregon, having practically the same condition as the farm at the Burns Station, the value of this discovery is obvious. The process of connecting up the two moisture areas has continued during the winter, and in the spring of 1913 borings indicated that fully 80 per cent of the area of the farm was moist from the surface all the way down to the water table.

Moro Station. Cooperative work with the U. S. Department of Agriculture at the Dry Farming Substation at Moro has been continued as heretofore. The permanent plan of work as already reported has been continued except that more space has been allotted to field peas, alfalfa, and other diversified crops.

Field peas grown in double drill rows, 35 inches apart, gave yields as high as 26 bushels an acre, which at 3 cents a pound (the local price) gave a return of \$46 an acre, at no greater cost of production than wheat, which gives an average return in that district of \$15 an acre. Field peas, however, may be grown every year, whereas wheat gives the return named only every other year; further, the field pea increases fertility while the wheat decreases it.

Good results have been secured from alfalfa, a yield of one ton of hay to the acre being recorded, and the promise of abundant seed production is assured.

The results from the tests of a large number of varieties of cereals, including both winter and spring varieties of wheat, barley, oats, and emmer, are good in practically every case, showing the marked superiority of the Station varieties over those locally grown, the difference in yield in favor of the best Station varieties running anywhere from three to six bushels.

Excellent results were obtained from corn, the Station varieties proving the best, as heretofore.

Pasturing off field peas with hogs also proved a successful experiment, and one of widespread value. The pasturing off of corn with hogs is to be undertaken next year.

The complete list of experiments previously outlined, aggregating some five hundred different trials, will be continued the coming year.

Umatilla Station. A fairly complete report of the work of this station and the Southern Oregon Station at Talent is published in Station Bulletin No. 115; hence a list only of the principal problems under investigation at these stations will be included in this report.

At the Umatilla station investigations have been undertaken in such problems as the clearing and leveling of new land; when to clear land; how to clear and level; applying irrigation; flumes and ditches; soil fertility; variety tests of fruits including the apple, pear, quince, prune, plum, cherry, nectarine, peach, apricot, and cane fruit, including currants, gooseberries, raspberries, dewberries, blackberries, loganberries, and other fruits and vegetables, including grapes, strawberries, asparagus, rhubarb, melons, potatoes, corn, eggplant, peanuts, and tomatoes. Experimental investigations have also been carried on in respect to cover crops, including field peas, vetch, espercett, red clover, sweet clover, alfalfa, crimson clover. Other forage crops tested were Kaffir corn, milo maize, sorghum, and millet.

Various phases of irrigation were studied, soil-moisture determinations made, trees for wind-breaks and ornamentals were tested, forest plantings and meteorological observations were also made.

Southern Oregon Station. The work reported last year has been continued and the most important new work is the very large planting of foreign pears, representing nearly 500 varieties. The purpose of this work is to secure stocks which are resistant to fire blight, and by means of selection and cross pollination it is thought possible to obtain good varieties of commercial pears that may also be resistant to blight.

Hood River Station. The work of the Hood River Station is well established, and laboratories are fairly well equipped for the investigations. The major work of this station is an investigation of what is commonly known as fruit pit or core rot. Work on the problem of fruit pit and winter injury is conducted cooperatively between the departments of Plant Pathology and Horticulture. In addition to the problems mentioned, apple scab, irrigation, some fruit pests, and orchard cover crops, are under investigation.

PUBLICATIONS.

Following is a list of the publications which have been issued during this biennium:

Bulletin No. 110—Preliminary Frost Fighting Studies in the Rogue River Valley.

Bulletin No. 111—Orchard Management.

Bulletin No. 112—The Soils of Oregon.

AGRICULTURAL EXPERIMENT STATION

Bulletin No. 113—Orchard Irrigation Studies in the Rogue River Valley.

Bulletin No. 114—Hop Investigations.

Bulletin No. 115—Biennial Report of the Division of Horticulture.

Research Bulletin No. 1, Part 1—The Pollination of the Pomaceous Fruits.

Circular Bulletin No. 20—The Pollination Question.

Circular Bulletin No. 19—The Trap-Nest.

Circular Bulletin No. 18—The Hog and Field Pea Special—Swine Husbandry.

Biennial Crop Pest and Horticultural Report.

Respectfully submitted,
JAMES WITHYCOMBE,
Director, Oregon Experiment Station.

REPORT OF THE EXTENSION SERVICE.

To the President of the College,

Sir: I have the honor to submit herewith a report of the Extension Service of the College for the past biennium. I am also including a brief statement of the plans for future development.

ORGANIZATION AND JURISDICTION.

By order of the Board of Regents, the Extension Service was organized November, 1911, charged with the duty of extending the advantages of the College to the people of the State who are not in a position to undertake resident work. The organization, as defined, is one of the three main divisions of the College activities; namely, Resident Instruction, Experiment Station, and College Extension. The jurisdiction of the extension organization is defined as including all work carried on by the Agricultural College which is not a part of the regular resident instructional work or the regular experiment station service. It includes, in its present form, the following distinct lines of effort:

(1) The publication of bulletins, both instructional and news. (2) Correspondence courses. (3) Institutes, including teachers' institutes, farmers' institutes, and other special forms. (4) All exhibits at fairs and other special occasions. (5) Classwork and lectures at local chautauquas. (6) Movable schools of from three to six days duration. (7) Individual advisory work with the farmers of the State. (8) Officiating and judging at fairs. (9) Conducting conferences of from one to two weeks duration—one at the College, one in Eastern Oregon, and one in Southern Oregon. (10) The supervision and direction of the work of the county agricultural agents. (11) The supervision and direction of boys' and girls' industrial club work in cooperation with the State Superintendent of Public Instruction. (12) Special field dairy work. (13) An educational campaign for the prevention of hog cholera. (14) Farm management demonstrations and surveys. (15) Assisting in rural organization and the marketing of farm products.

In the last six named projects, the U. S. department of Agriculture is cooperating with the College. The last three projects named have not been in effect during the past biennium, but are now provided for and will be initiated at the beginning of the next fiscal year.

The administration of the extension service is vested in a Director of Extension and heads of the various departments of the service or-

ganized as the work is developed. These departments now consist of (1) County agriculturists in charge of a State leader of county work. (2) The department of industrial clubs in charge of a State leader of industrial club work. (3) The press bureau in charge of an editor of press bulletins. (4) The other lines of extension service such as itinerant lectures and schools, institutes, exhibits, individual advisory work and publications which are under the immediate supervision of the Director of Extension and the Secretary. These various lines of the service are closely related and harmonized to the end that a definite extension program may be carried out effectively and economically. The organization has been greatly strengthened and more nearly perfected during the past year, especially since the extension work of the United States department of Agriculture, carried on in Oregon, has been placed under the direction of the College extension organization.

Subject Matter of Instruction. The subject matter of extension instruction includes all subjects in the College curriculum which will lend themselves to extension methods. This represents, therefore, certain work in all lines of agriculture, home economics, commerce, engineering, forestry, as well as some general phases of applied science.

The State Law. The State law (Chapter 110, Laws 1913), which authorizes the College to do educational extension work and provides for the support of this service, is one of the most advanced and most effective laws passed by any state in the Union. The law, in brief, provides as follows:

(1) For general educational extension work throughout the State,—this to include itinerant lectures, publications, exhibits, and other methods necessary to carry out the purpose of the act. (2) It authorizes the various county courts to make appropriations for the support of agricultural demonstration and field work, provides that such appropriations will be duplicated by the State, and vests the direction of the work in the Oregon Agricultural College. The merit of this particular provision of the law lies in the fact that the work must be initiated through an appropriation by the local government, and, consequently, must represent a demand from the people immediately concerned; at the same time it provides encouragement by offering assistance from the State. By vesting the direction of the work in the Agricultural College, it establishes a guarantee that the work will be carried on in a uniform manner throughout the State, and in such way that all the forces working for the development of agriculture will be completely harmonized. (3) It further provides that in case Congress or the United States department of Agriculture should provide funds for extension work in this State conditioned upon a duplication by the State, such State money would become available. This has made it possible for Oregon to enjoy considerable advantage over other states in securing assistance from the Federal Government. (4) The law also encourages the development of industrial work in the public schools by directing the State Superintendent of Public Instruction and the State Agricultural College to cooperate in promot-

ing and supervising, in all of the counties of the State, the teaching of agriculture and home economics, the organization of school fairs, industrial clubs, school garden contests, and other forms of industrial work.

Extension Funds. The funds for the support of the Extension Service come from three sources: (1) The State, which appropriates \$25,000 a year and duplicates (a) county appropriations for county agricultural work and (b) Federal appropriations conditioned upon such duplication. (2) The counties, which make appropriations for county agricultural work. (3) The United States department of Agriculture, which appropriated approximately \$4500 for work during the past year. This sum will be increased approximately \$13,500 for the next fiscal year. In addition to this, the State will profit by the appropriation made under the terms of the Smith-Lever Bill. (4) Beginning July 1, 1914, the Smith-Lever Bill, an Act of Congress appropriating \$10,000 to each State the first year, and additional appropriations based on the rural population of each state, during each following year for a period of ten years.

GENERAL STATEMENT OF WORK OF PAST BIENNIUM.

While this law was passed in January, 1913, it did not become effective until June. Consequently, the work provided for has been in force for but a little over a year. In considering the report of work actually accomplished during the past biennium, it will be necessary, therefore, to keep in mind the fact that while the report covers a period of two years, the work was in full force only about thirteen months.

The following data are taken from the report of Mr. Collins, Secretary of Extension: During the biennium, which ended June 30, 1914, representatives of the College filled extension appointments in 230 towns and rural districts of the State, conducting institutes and demonstrations with a recorded attendance of 140,543 people. Probably as many more people were reached by means of exhibits, chautauqua lectures and demonstrations carried on in connection with judging at county, grange, and school fairs. Each of these meetings has been addressed by from one to five College speakers, the service requiring a total of 2,556 days.

Extension Bulletins. Extension bulletins totalling 341,900 copies under the 72 titles listed below, have been published during the period covered by this report. These bulletins have been prepared in clear, simple form without the use of technical terms, and with special application to Oregon conditions. The subject matter is not limited to experimental work actually carried on by the station force in Oregon, but represents a compilation of the best information available. It is the policy of the Extension Division to publish, from time to time, a list of these bulletins, which is circulated as widely as possible in the State. Those wishing the publications are requested to write to the institution for those

in which they are interested. The titles of these bulletins and the number published in each instance are as follows:

Title	No. Published	Author
Breeds of Chickens (Reprint).....	2,500	James Dryden
Camp Cookery (Reprint)	5,000	Miss Ava B. Milam and Miss Ruth Smith
Feeding for Eggs	5,000	James Dryden
Herd Record Keeping	5,000	W. A. Barr
Highway Construction	5,000	E. F. Ayres
Housing of Chickens (Reprint).....	5,000	James Dryden
Incubating and Brooding (Reprint).....	5,000	James Dryden
Industrial Contests for Oregon Boys and Girls	25,000	R. D. Hetzel
Legislation Providing for Agricultural Extension Field Work in Oregon.....	2,000	R. D. Hetzel
List of Bulletins	1,000	R. D. Hetzel
Principles of Bread Making	5,000	Mrs. H. W. Calvin
Principles of Cake Making	5,000	Miss Ava B. Milam
Principles of Jelly Making	5,000	Miss Ava B. Milam
Some External Parasites of Poultry.....	2,500	H. E. Ewing
The School Luncheon	5,000	Mrs. H. W. Calvin
Insect Pests of Truck and Garden Crops.....	5,000	A. L. Lovett

New Extension bulletins published during the fiscal year July 1, 1913-June 30, 1914, were 49 in number. Seven others were reprinted. Total number of copies was 253,900. Following are the titles, together with the number printed and the author:

Title	No. Published	Author
Industrial Clubs and Contests for Oregon Boys and Girls	50,000	F. L. Griffin
Insects Injurious to Timber	150	V. I. Safo
Fowl Tuberculosis	2,500	T. D. Beckwith
Septic Tanks and Absorption Systems.....	5,000	T. D. Beckwith-T. A. Teeter
Feeding the Dairy Cow	5,000	R. R. Graves
Raising the Dairy Calf	5,000	E. F. Bitts
Incubating and Brooding (Reprint).....	7,500	James Dryden
Breeds and Judging of Dairy Cows	7,500	W. A. Barr
Housing of Chickens (Reprint).....	5,000	James Dryden
Oregon Station Trap Nest (Reprint).....	5,000	James Dryden
List of Bulletins (Reprint).....	5,000	R. D. Hetzel
Breeds of Chickens	2,500	James Dryden
Feeding for Eggs (Reprint).....	7,500	James Dryden
Farm Butter Making	2,500	O. G. Simpson
Care of Milk and Cream.....	5,000	O. G. Simpson
Silo Construction and Silage Feeding.....	5,000	W. A. Barr
Improving Oregon Dairy Herds.....	5,000	R. R. Graves and E. B. Fitts
Handling the Fruit Crop.....	7,000	C. I. Lewis-W. S. Brown
Growing the Oregon Potato Crop.....	7,500	H. D. Scudder
How and When to Spray the Orchard.....	5,000	H. S. Jackson-H. F. Wilson
Oregon Corn	7,500	H. D. Scudder
Treatment of Granular Vaginitis.....	400	B. W. Simms
How to Conduct a Fly Campaign.....	20,000	H. F. Wilson
Fruit and Vegetable By-Products.....	5,000	W. S. Brown
Feeding Young Chickens	5,000	Miss Clara Nixon
Making Babcock Test and Keeping the Records	5,000	W. A. Barr
Suggested List of Tools and Materials.....	5,000	H. C. Brandon
Enrollment Acknowledgments	1,000	F. L. Griffin
Hotbeds and Coldframes for the Garden.....	2,500	A. G. B. Bouquet
Sewing (Ind. Club No. 113).....	2,000	Mrs. L. W. Robbins
Starchy Foods	1,000	Mrs. L. W. Robbins
Planning and Planting the Garden.....	2,500	A. G. B. Bouquet
Selecting and Caring for the Flock.....	2,500	A. G. Lunn
Feeding and Care of Dairy Cows.....	5,000	E. B. Fitts
Feeding for Pork and for Show.....	2,500	G. R. Samson
Questions on Lesson 1, Breeds of Chickens.....	1,000	A. G. Lunn
Creamed Soups and Vegetables	2,000	Mrs. L. W. Robbins
Essentials of Bread Making.....	5,000	Mrs. H. W. Calvin
Corn Growing, Project Circular	500	H. D. Scudder
Vegetable Gardening Project Record.....	2,000	A. G. B. Bouquet
Cooking Project Record	1,000	Mrs. H. W. Calvin
Pig. Project Record	500	G. R. Samson
Cultivating and Caring for the Garden.....	1,000	A. G. B. Bouquet
Sewing—Cotton Goods No. 134.....	2,500	Mrs. L. W. Robbins

Canning Project Record	2,500	Mrs. H. W. Calvin
Sewing—Ind. Club No. 141.....	3,500	Mrs. H. W. Calvin
Poultry Project Record	1,000	A. G. Lunn
Corn Growing Project Record.....	1,000	H. D. Scudder
Project Circular for Incubating and Brooding..	1,000	A. G. Lunn
Sewing—Ind. Club. No. 160.....	350	Mrs. L. W. Robbins
Potato Growing Leaflet	1,000	H. D. Scudder
Circular Letter to Club Members.....	12,000	F. L. Griffin
Veg. Gardening Project (Reprint).....	1,000	F. L. Griffin
Potato Growing Project (Reprint).....	500	H. D. Scudder
Construction—Manual Arts Circular.....	2,000	D. G. Thayer
Project Circular No. 2-No. 131.....	1,000	Mrs. L. W. Robbins

Chautauqua Engagements. During the bienrium faculty members have given lectures and demonstrations at ten local chautauquas in different sections of the State. In many instances as many as six instructors have been in attendance and have conducted regular courses of lectures and demonstrations throughout the chautauqua period. At several of these chautauquas special days were set aside as college days, or as farmers' and home-makers' days. Upon these occasions the programs for the entire sessions were turned over to the College representatives.

Correspondence Courses. Correspondence courses in Business Methods for the Farm, Rural Law, and Rural Economics, have been offered during the biennium and have been taken by 58 students. Additional courses will be instituted during the next biennium as described later in this report.

Special Demonstration Work. A great deal of special demonstration work has been done during the period of this report including the use of a demonstration train operated over the Southern Pacific lines in Oregon. The itinerary of this train covered two weeks and included 54 stops. The staff of lecturers and demonstrators was made up of seven members of the College staff, and five prominent and successful dairymen. More than 36,400 people turned out to see the demonstrations and listen to the lectures during this tour.

Special attention has also been given to demonstrations in the fields and orchards of the State. The work was started during the latter part of 1913, when two demonstrations were carried on with a total attendance of 250. During the last year this number was increased to 25 demonstrations with a total attendance of 1,959. In this service the demonstrators have gone into the field and actually carried on the work so that every detail might be observed by those in attendance. This has been very effective, especially in certain phases of fruit growing such as the pruning of trees and spraying for plant diseases and insects. This method of instruction has also been found very effective in connection with the home economics work. During the past year twelve special demonstrations in this subject have been carried on with a total attendance of 1,656. This does not include the great amount of work of this character that has been done in connection with the work of the movable schools. The instruction undertaken in connection with these demonstrations has been principally with cooking, home nursing, and dressmaking.

In August, September, and October of 1913 the College did a great deal of special demonstration work in connection with the campaign against fire blight.

Educational Exhibits. Educational exhibits have proved to be an effective method of instruction. The principal exhibit carried during the past two years has been that at the State Fair, where the College has occupied approximately 1,400 feet of floor space. The display each year has been inspected by almost every visitor at the Fair, and in many instances has been studied very thoroughly by persons interested in various branches of the work. The exhibits are designed to give suggestions of the best methods of procedure in agricultural production, home organization and management, and in other lines of industrial enterprise. Demonstrators and lecturers were in attendance throughout the week.

Moving pictures illustrating the proper methods of poultry raising and representing views of College activities were shown daily throughout the week both in 1912 and 1913. Several lectures on subjects of interest were also delivered by members of the faculty. These discussions included such subjects as farm credits, rural organization, farm homes, and various lines of agricultural production.

The College sent a vitascope showing views of the College work and farm scenes in Oregon, together with placards giving information relative to agricultural production and possibilities in this State, to the Chicago Land Show in both 1912 and 1913.

Special poultry exhibits were prepared and sent to the Albany Poultry Show January 6 to 9, 1914, and later to the Baker Poultry Show. The exhibit occupied practically 150 square feet of space and showed a model poultry house, hatching coops, different types of brooders and trap nests, suggested proper rations, illustrated the best methods of feeding and caring for poultry. A lecturer and demonstrator was in charge of the exhibit.

An exhibit consisting of about 100 varieties of nuts, several panels illustrating the proper processes of grafting, budding, and pruning, and suggestions for identifying and combating insect and fungous diseases, was sent to the National Apple Show at Spokane. The exhibit was in charge of a representative of the College staff who answered questions and helped to interpret the instruction conveyed by the exhibit.

Institutes and Lectures. During the past two years, 632 institutes and itinerant lectures, with a total attendance of 103,977 people, have been conducted under the direction of the Extension Service. The average attendance at each of these meetings was 164. Every county in the State has been visited—the demand for and distribution of the work bearing a direct ratio to the population. The institutes varied in length from one to six sessions. The College representatives spent a total of 982½ days in this branch of the service.

The classification of institutes and lectures showing the number of institutes, number of sessions, distribution of attendance and time devoted to the work, is as follows:

	Number	Sess.	Days	Attendance
Farmers	365	477	521	41,976
Special	238	362	385	56,454
Teachers	29	41	76½	5,547
	632	880	982½	103,977

Itinerant Schools. During five weeks of the summer of 1913 the College put out two special movable schools which traveled over the greater part of the State. One staff conducted two-day sessions in sixteen of the larger towns, giving instruction along lines of home economics, social hygiene, civic improvement, sanitation, pure foods, etc. The other party held a series of 29 one-day meetings in rural sections. The work of this staff included instruction in various lines of agriculture and home economics. Each staff was composed of from five to seven members. The College representatives were assisted by Mr. J. D. Mickle and Mr. M. S. Shrock of the State Dairy and Food Commission, Mr. E. J. Cummins, of the Oregon Social Hygiene Society, and Mrs. Orla Buxton, of the State Grange.

Judging and Officiating at Fairs. A great deal of time and service is required each year to officiate and judge at the various county fairs. In 1912 we were called upon to officiate at 32 fairs, and the following year this number was increased to 39. It required from one to four judges to do this work at each of the fairs. Our representatives judged the various agricultural and domestic science and domestic art exhibits. Wherever possible, the College people gave instruction in connection with the judging.

Itinerant Short Courses. During the biennium short courses of one week's duration have been held at Burns, Prineville, and Klamath Falls. The College sent three or four instructors in each instance and these were assisted by local speakers. The work covered instruction in agronomy, animal and dairy husbandry, and home economics. Laboratories were equipped, live stock was brought in, and classrooms were provided; so that those in attendance were given an opportunity to do actual practice work, as well as to see the demonstration and listen to the lectures. This type of instruction promises to be very effective and will be used to a much greater extent in the future.

COUNTY AGRICULTURAL WORK.

Up to the present time the following ten counties have taken advantage of the provision of the law authorizing and providing for the employment of County Agricultural Agents: Coos, Crook, Harney, Klamath, Lane, Malheur, Marion, Tillamook, Union, and Jackson. The appropriations made by these counties vary from \$1500 to \$2000, six having appropriated the larger sum. Several other counties have manifested interest in the work and are planning to take it up in the near future.

Organization of County Work. This branch of the Extension Service is being organized under the immediate direction of Professor H. T. French. The Bureau of Plant Industry, U. S. Department of Agriculture, is cooperating with the College to the extent of paying one-half the cost of this overhead supervision. This also gives us the advantage of the broad experience and the great fund of valuable information possessed by the Federal officials.

Since Professor French took up the work in September, 1913, he has devoted much of his time responding to calls from the various counties interested in the county work. He has found the farmers generally very appreciative of this new service and anxious to have it established in their counties. As rapidly as the people learn of the nature of the work, the demands for it increase. It has been necessary for the College officials to discourage the rapid spread of the work because of the difficulty in finding men properly qualified to give the best service.

Nature and Results of County Service. The County Agricultural Work has not been in effect for a sufficient period to demonstrate the maximum value of the service. Our limited experience, however, indicates that this will prove to be one of our most effective extension operations. The fact that the County Agent becomes a resident of the county makes it possible for him to become intimately acquainted with the people and to learn the peculiar conditions prevailing in his particular county, thus giving him a decided initial advantage. His acquaintance with the people and his knowledge of local conditions puts him in close sympathy with local problems and gives him a local point of view. This local acquaintance not only serves to make his own efforts more effective, but it makes it possible for him to choose wisely the sources of outside assistance, and to shape and adjust it so that it can be used to best advantage. In this respect the County Agent is proving a powerful factor in increasing the effectiveness of the work of the Central Extension staff of the College. The County Agent, who cannot be a specialist in all branches of agriculture, calls to his aid the specialists from the College staff and thus brings to his county the greatest possible service.

The nature of the work varies in different counties and with different agents. In counties where a certain line of agriculture greatly predominates, as does dairying in Coos and Tillamook counties, and fruit raising in Jackson, the County Agent is concerned principally in bringing this major line of work to the highest point of development. To this end the agents in the dairy counties have devoted most of their efforts thus far to the task of dairy organization, with the result that breeds are more uniform, poor dairy animals are being disposed of, better marketing arrangements are being perfected—in short, the dairy industry is being advanced. In counties where diversified farming predominates, the county men are working on such problems as proper crop rotations, better seed, the standardization of certain crops, better marketing methods, better business methods, etc.

The county agents are concerned with the social welfare of the rural districts as well as with the problems of production and marketing. The improvement of the rural schools, the encouragement of farmers' organizations, the promotion of social or community centers, and the rejuvenation of the rural church, are all matters that enlist the interest and services of the county man. In short, it is the business of the county agent to serve to his fullest capacity the real interests of the county in which he is located.

As was expected, the work of the county agents has met with criticism and opposition. It is safe to say, however, that in nine cases out of ten, this is due to misinformation, or lack of information regarding the work. As the work in the various counties progresses, the farmers are rapidly enlisting in the service, and in many instances we now number among our most ardent and enthusiastic supporters those who were once our most caustic critics.

During the next year the organization of this work will be much more highly perfected, and, as a consequence, the work will be more effective and more far-reaching. Special attention will be given to organizing the farmers for certain definite purposes such as the production of uniform high-type, standardized seed potatoes, more and better corn, more and better clover; better marketing; the promotion of better social conditions—in short, the development of those interests which mean most to the welfare of the county.

At the present time many of the county men are unable to meet the demands made upon them by the farmers. Requests for every conceivable type of service come to them. To indicate something of the variety of these, and of the estimated value of this part of the service, I am quoting a few typical examples from the reports of the county agents:

Mr. Chapin of Marion County advised a grower to sow five acres of clover in a section where it was thought clover would not grow. The experiment was so successful that the grower sowed twenty acres more, and has purchased a number of dairy cows. In this community several hundred acres are now in clover representing thousands of dollars of increase in the yield and the value of land.

In Coos County, through the advice and assistance of Mr. Smith, five cow-testing associations have been organized, resulting in a great saving of money and improvement in the dairy herds.

Mr. Lovett of Crook County discovered a contagious infection among the hogs on the farm of one of his constituents, checked the disease, and saved the owner from severe loss.

Mr. Rader, of Lane County, upon analyzing seed which was about to be sown as rape seed, found it to contain 96.38 per cent mustard. In this case the damage would have been almost beyond calculation had the seed been sowed as intended. By planning farm crops and outlining a method of cultivation and the proper use of farm labor, Mr. Rader saved one farmer \$100 in labor cost besides a liberal increase in crops due to change in methods of farming.

These instances could be multiplied without number, representing a service that will mean the saving of thousands of dollars to the farmers of the various counties, and a greatly improved method of farming which in the very near future should mean an income increased by a margin which we dare not estimate.

INDUSTRIAL CLUB WORK.

Another branch of the Extension Service that gives equal promise of being of exceptional value to the people of the State, is the Industrial Club Work. The Boys' and Girls' Industrial Club Work is the direct outgrowth of the Industrial Fair movement started during the fall of 1911-12. These Fairs were promoted for the purpose of interesting the boys and girls of the State in industrial education, and especially in the phases of industrial education that were immediately applicable to their conditions. The work was encouraged and supported by the State Bankers' Association, the Portland Chamber of Commerce, the Oregon Development League, and other organizations, and was promoted under the immediate direction of the State Superintendent of Public Instruction and the Oregon Agricultural College.

The Industrial School Fairs. The result of the first year's work was to stir up very widespread interest on the part of both the young people and the parents of the State. This was done by offering prizes for the best products exhibited at local school and county fairs, and at the State Fair. The prizes were furnished by interested individuals and organizations, and amounted to a total sum of approximately \$20,000 the first year. It was estimated that approximately 75,000 children exhibited one or more articles at fairs during this time.

Reorganization. At the beginning of the second year, the work was reorganized so as to offer more definite instruction and direction. All concerned realized that if it was to become a permanent part of a constructive program for the development of industrial education, it would be necessary to provide for a definite program of instruction as broad in its scope as was the inspirational program of the year preceding. Accordingly, an agreement was reached between the Director of the Extension Service of the College, and the State Superintendent of Public Instruction, providing for a more extensive organization and a more substantial program of work. A State Leader of Club Work was employed by the College, and the work was organized as a part of the Extension Service. The State Leader, assisted by the two Industrial Field Workers employed directly by the State Superintendent, and in cooperation with the county superintendents and teachers, undertook the organization of Boys' and Girls' Industrial Clubs.

Nature of the Work. The nature and purpose of this work are well defined by the following quotation from the report by Professor F. L. Griffin, the State Leader: "Club work is based upon the idea of organizing into definite projects those major activities of home and farm,

which lend themselves to this scheme of home and school industrial training. Each project contemplates a year's or a season's productive effort along economic and practical lines. The chores or duties that most children are obliged or should be compelled to do at home, and which are too often regarded as disagreeable tasks, are made attractive by breathing into each the spirit of science. The practical nature of the Club projects appeals to the average youth as he feels that he is doing a man's job. The fact that he may derive an income from his labors does not detract from the usefulness of the work. Often the parent is induced to enter into a partnership with the son, and the sense of proprietorship which comes to the junior member will do more to keep the boy on the farm than any amount of argument. The tasks and chores thus become a pleasure and enough of the natural competitive instincts of childhood are utilized to sustain the interest of the contestants through the contest period of several months.

"Club Projects. Ten definite farm and home activities were selected as a basis for the first year's Club work. Each of these was organized into a definite project which called forth constructive effort during a period of several months. The Club projects encouraged during 1914 were as follows: Corn growing, Potato growing, Vegetable growing, Poultry raising, Pig raising, Dairy herd record keeping, Sewing, Cooking, Canning, and Woodworking.

"Simple rules were made for carrying on each project and directions for doing the elected task were given in pamphlet form, prepared and distributed by the Oregon Agricultural College Extension Service. . . .

"Organizing Clubs. Industrial Clubs were formed in every school district in the State where there were enough boys and girls interested in the work. It was not necessary for a child to be a member of a local Club, however, in order to participate in the Club contests, as any boy or girl in the State, between the ages of 10 and 18, by enrolling with the State Leader, could undertake any Club project, receive all the Club publications issued for that project and be eligible to compete in any Club contest."

The County School Superintendents were recognized as the Club Leaders in their respective districts. Wherever possible, the teachers were induced to become the local Club Leaders, but where teachers could not be properly interested, an attempt was made to find some suitable person in the locality who would assume this responsibility.

Educational Prizes. It was found advisable and necessary to continue the use of prizes in order to stimulate interest and effort on the part of the young people. The so-called prize evil was minimized, however, as much as possible by reducing the intrinsic value of the prizes, and substituting therefor an educational value wherever possible. This was done by providing as prizes free trips to the State Fair, the Agricultural College, and the Panama-Pacific Exposition at San Francisco. This arrangement included as awards to the two boys in each county who received the highest rating for their Club work, membership in the State

Fair Camp and School, which was held at Salem this year for the first time. This was provided for by the State Board of Fair Directors, who set aside \$500 to pay the expenses of the boys while in camp. The various counties raised the funds necessary for paying the traveling expenses of the boys to and from the Fair Grounds.

"Perhaps the best incentive that can be offered for Club Work, especially along agricultural lines," says Professor Griffin, "is the labor income that boys and girls can derive from their Club projects. It is possible for Club members to earn from twenty-five dollars up to several hundred dollars in a single season as the result of their vegetable, corn, potato, poultry, pig, or other Club work, and money earned in this manner carries with it a respect for labor, the formation of habits of thrift, and a knowledge of the possibilities of a small piece of ground well tilled."

Club Enrollment. Over 11,000 boys and girls enrolled for one or more Industrial Club projects during 1914, the total enrollment by project being as follows:

Sewing	3358	Corn	984
Canning	1332	Potatoes	939
Cooking	2065	Gardening	2745
Manual Arts	1166	Poultry	1429
Dairy	148	Pigs	485

While it is too early to determine the number who will continue the work throughout the season, indications are that it will represent a large proportion of those electing the work.

In promoting the work, thirty-eight Club circulars and bulletins have been issued. In addition to this, the publications of the United States department of Agriculture have been utilized, and a great many circular letters were sent to Club Leaders and to the boys and girls entering in the projects.

The United States department of Agriculture, through the Office of Farm Management, has joined with the Agricultural College and the State Superintendent of Public Instruction, in the support of the Club work in Oregon. This brings to the aid of the Club work the united support of these three great educational institutions and makes possible a harmonious, vigorous, cooperative effort which should be an absolute guarantee of permanent and effective educational effort along these lines.

Results of Club Work. The following, taken from the report of Professor Griffin, indicates both the utilitarian and the educational purpose which lie back of the Club project work: "While the Boys' and Girls' Club movement in Oregon is less than a year old, results of a positive character are already discernible.

"In the Dairy Herd Record Keeping contest the Club members have in many cases obtained enough definite information concerning their father's or neighbor's herds to enable the 'boarders' to be culled out.

"The aim of the Poultry project is to build up better laying strains of fowls and help the members to market their eggs and poultry to best advantage.

"One result of the Corn Club work will be the demonstration that corn can be profitably raised in many sections of the State where it is not now regarded as a valuable crop. The improved methods of seed selection and cultivation taught the Club members, will become the common practice of the community.

"In the Potato Club work the standardization of the crop will be encouraged, and the increased yields resulting from the use of better seed and cultural methods will more than justify any expense this work involves.

"Hundreds of Oregon homes have been, and are, enjoying the use of more vegetables than ever before, because of the Garden Club work, and, to the extent that vegetables are raised and consumed or sold, the cost of living is being reduced in those homes.

"The Canning project encourages the Club members to save the fruits and vegetables that otherwise go to waste, and enables many a home to save food in times of plenty for the day of want. This same project also points out a way whereby many boys and girls can accumulate a bank account through the canning and marketing of garden and orchard products.

"**Letters from Boys and Girls.** That the Club movement is really getting a hold upon the boys and girls is evidenced by the hundreds of letters which they have written to the State Club Leader. When healthy normal boys and girls, upon their own initiative, take the time and energy to pen a two- to four-page letter, it is safe to say that the subject under consideration means something to them."

COOPERATIVE DAIRY WORK.

During the past fiscal year, July 1, 1913, to June 30, 1914, the Extension Service has carried on a special line of dairy work in cooperation with the Dairy Division of the Bureau of Animal Husbandry, U. S. department of Agriculture. The arrangement provides for the employment of two field dairymen, and the expense of maintaining the work is divided between the Federal Office and the College.

This work was inaugurated early in July with Mr. W. A. Barr in charge of Western Oregon, and Mr. M. J. Lazelle, located at Hermiston, in charge of the Eastern Oregon field. Mr. Lazelle did very effective work until his illness and death in the late fall of 1913. Mr. S. J. Damon was appointed to succeed Mr. Lazelle in February, 1914. Mr. Barr has been continually in the service since his appointment.

Nature of the Service. This work consists principally of advice and assistance to individual dairymen. The representatives, after becoming acquainted with the conditions under which dairying can best be promoted in the various communities, offer their assistance to the farmers who may be interested in the development of that branch of agriculture. They assist in organizing cow-testing associations, bull associations, breeders' associations, etc., and give assistance in planning and building

silos, dairy barns, and other structures connected with the dairy industry. Mr. Barr has also taken a prominent part in institute meetings, short courses, and demonstration train service. The work of these field men has been a prominent factor in the increased interest in dairying and the improvement in dairy methods which has developed during the past year.

The dairy herd record work, which has been incorporated into the Industrial Club projects, was initiated by Mr. Barr. He first installed the work in the schools of Polk County. Since that time he has been called upon to assist in starting the work in Marion, Yamhill, and Jackson counties. A number of other counties have taken an active part in the work and promise to install the system some time during the next fiscal year.

The dairy field men have also prepared several of the Extension publications on dairying. In short, the work of these two agents has been so organized as to use their services to the best advantage in carrying on the general plan of dairy extension work in the State.

Provision has been made for the continuation of this work during the next fiscal year. The nature of the work will be practically the same as that during the past year. It is expected, however, that it will be even more effective because of the better organization of the entire Extension Service and the fact that this particular branch of the work will be more closely harmonized with the various branches of the Extension Service.

THE PRESS BUREAU.

A Press Bureau has been maintained at the College for a number of years and was taken into the Extension Service when that work was separately organized in November, 1911. The purpose of this bureau is to gather and disseminate through the newspapers and other publications information that would seem to be of immediate value to the people of the State. It affords a quicker, and in some respects, a better way of getting out information than the publication of regular Extension and College bulletins.

Extent and Nature of News Service. The service includes the publication of (1) a printed bulletin, four columns in width and approximately a column in length, containing from eight to fifteen separate articles each week; (2) special articles prepared and sufficient copies provided to mail to each of the several daily papers in the State, and to some of the special publications; (3) exclusive articles prepared for the publications, generally upon request, and representing special service.

The printed bulletin is sent to 159 Oregon weeklies, 13 general or special farm publications in Oregon, 300 daily or weekly papers in other Pacific Coast states, and 15 dairy publications. It is also sent to 63 general agricultural, 22 live-stock, 37 poultry, 13 horticultural, 7 home-economics, 17 technical, and 21 miscellaneous publications in the United States, and to 9 miscellaneous publications in foreign countries.

The service defined under heading No. 2, is furnished to 51 weeklies and 37 dailies in Oregon, and to 11 agricultural publications in other Pacific Coast states.

The special articles, as defined under heading No. 3 above, are sent to practically all of the Oregon dailies, weeklies, and special publications, when they contain matter of particular local interest. More than 500 of these special and exclusive articles have been sent to other Oregon papers during the year ending Jun 30, 1913.

Information of value to the people of the State is given very broad circulation through the use of the American Press Association, the American Type Founders' Company, and the Home and Farm Magazine, all of which represent patent inside, or plate service, to a large number of the smaller publications of the country.

Extent of Use. It is impossible to determine the extent to which this material is used, but indications are that it is drawn upon very extensively. During the period of time from July 8 to December 30, 1913, there were collected from the Clipping Bureau 920 pages of clippings. This probably did not represent more than half or three-quarters of the material actually used.

Value of Service. Something of the actual value of this work is indicated by the nature of a few of the articles, which Mr. McIntosh calls to my attention.

At an opportune time the Bureau published a series of articles on the clover midge, the destruction which it was threatening, and the best methods of combating it. Had the farmers of the State acted upon this advice, they would have been able to save many thousands of dollars worth of hay which later was wasted in an attempt to save it for a seed crop.

Just recently the Bureau published an article advising the farmers of the necessity of taking certain precautions in order to avoid the cut-worm menace next year. In so far as this information is followed, it should represent a great saving to the farmers of the State.

Similarly valuable and suggestive articles have been published under such subjects as the canning of cracked cherries, feeding of pigs in order to supply the proper amount of protein, the use of by-products, advice as to methods of avoiding hog cholera, etc.

That this material is used by the various publications, and read by farmers of the State, is daily established by the fact that great numbers of requests for additional advice follow the publication of practically every article of this nature.

Most of the newspapers of the State have readily appreciated the value of this material from the standpoint of news service as well as its real value in correcting agricultural operations, and improving community conditions. We believe that this point of view will be accepted more generally by the newspapers as the merit of the work continues to prove itself. We also believe that the people of the State will constantly become more appreciative of the cooperative effort between the College and the newspaper editors in their behalf.

PLANS FOR THE NEXT BIENNIUM.

The past biennium has necessarily been principally a period of preparation, organization, and adjustment. It also has been a period of substantial accomplishment. Besides the extension service actually rendered as indicated in the first part of this report, there was prepared and passed by the legislature the best extension law to be found on the statute books of any state in the Union. An arrangement has been made with the United States department of Agriculture which gives Oregon the benefit of liberal financial aid and very helpful cooperation in the actual conduct of the Extension Service. The principal agencies within the State concerned with industrial education and industrial development have been enlisted with the College forces in a common campaign, so that the past biennium closes and the new biennium opens with great promise for effective, constructive work.

COOPERATION WITH U. S. DEPARTMENT OF AGRICULTURE.

The most important single factor in the organization of the work for the next biennium is the arrangement which has been perfected with the U. S. department of Agriculture for cooperative work. Under this arrangement the department is giving substantial financial assistance to the support of the work and is placing all of its extension service under the direction of the College extension organization. In this manner all extension work done in this State is harmonized and organized so as to bring about results without waste, duplication, or conflict. Under this memorandum the Bureau of Plant Industry is cooperating with the Agricultural College in the support of the overhead supervision of the County Agricultural work, the Boys' and Girls' Industrial Club work, and the Farm Management extension work. The dairy division of the Bureau of Animal Industry is cooperating with the College in maintaining the cooperative dairy work which gives to the State the services of two special field dairymen. The same bureau is also cooperating with the College in carrying on an educational campaign to prevent the spread of hog cholera. The Bureau of Markets and Farm Organizations is cooperating with the College in carrying on investigations along the lines of farm organization and marketing. The present plan contemplates placing a man in the field who would devote his full time to this phase of the work.

Smith-Lever Bill. The Oregon Extension Service, in common with that of the other states, will greatly benefit by the appropriations made by Congress under the provisions of the Smith-Lever law. This gives to the State the sum of \$10,000 for the present fiscal year unconditionally. This amount will be increased by approximately \$4,000 each year conditioned upon the State appropriating an equal amount. This money will be used in the promotion of practically all branches of the extension serv-

ice, with special attention to field demonstrations and individual advisory service.

Industrial Development Conferences. An added feature of the extension service during the next year will be the one-week residence conferences which will be held—one at the College, one in Southern Oregon, and one in Eastern Oregon. These will be made the occasions when the leading farmers, business men, prominent women, and others will be brought together for the purpose of considering some of the pressing problems affecting the industrial development of Oregon, and particularly the development of rural interests. It will be the plan to determine upon definite campaigns of work which will enlist all of the agencies working in these particular fields and direct their endeavors along common lines.

Instruction More Intensive. It will be the policy during the next biennium to limit the amount of institute and itinerant lecture work as severely as possible and substitute therefor short courses of from three days to two weeks duration, community surveys, demonstrations, and visits to individual farms and farming communities. In other words, an attempt will be made to make the extension instruction more intensive.

Service Adjusted to Needs. In the agricultural phases of the extension work the County Agriculturists act as the local representatives of the Extension Service. With their knowledge of local conditions and their acquaintance with local people, they are in a position to aid the College in so directing and using the other extension agencies as best to supplement their work and best adapt the entire service to the actual needs of the State. For example, the county agen may decide that his county will greatly profit by interesting the farmers in growing greater areas of clover. In order that this line of enterprise may be encouraged and properly initiated there will be sent from the Agricultural College a man, who is an expert on clover culture, to hold conferences and meetings with the farmers of the county. The College could also aid in this campaign by publications on clover culture and by promoting the idea through the Boys' and Girls' Club work. This same thing would apply in organizing for better social conditions and in a campaign for the standardizing of products and better marketing facilities, etc. In short, with the county agents and the central staff of specialists, the Extension publications, and the Boys' and Girls' Clubs, all working in harmony, the Extension Service is in a position to give exceptionally valuable service to the farmers of the State.

Farm Management and Marketing. While in the past the College has been concerned primarily with the subject of agricultural production, the time has now come when special stress can best be put on the development of farm-management methods and marketing. In other words, the Extension Service will give particular attention to the problem of organizing our farms in such a way that they will produce the highest possible net labor income. At the same time the greater and more difficult problem of proper marketing organization and procedure will be given

careful study, and as rapidly as conditions seem to warrant, aggressive organization work will be undertaken.

Social Problems. The social life of the rural sections, particularly the interests of the farm home, will also enlist a good share of the attention and energy of the service. An expert on home economics has been added to the staff and a supervisor of women's work has been employed to assist the State Leader with the Industrial Club work. Assisting these regular people are the members of the resident staff of the School of Home Economics.

While, because of the nature of conditions, the agricultural and home-economics work make the greater demands on the Extension Service, other lines of work will be promoted as extensively as practicable.

Extension Work in Engineering. A new undertaking during the fiscal year will be launched in the form of correspondence courses in several engineering subjects. This work will be handled in such a way that the students will have not only the correspondence instruction, but also assistance from regular instructors who will meet the classes periodically—probably once every week. Short courses and lectures in mining engineering subjects will be offered in different sections of the State. In this manner the College hopes to reach many of the young men of the State who will not have an opportunity to take up resident work at any of the institutions, but who wish to prepare themselves for advancement in the trades or in the engineering professions.

Cooperation and Assistance. I take pleasure in making acknowledgment of the special cooperation received from the office of the State Superintendent of Public Instruction, especially in the prosecution of the Industrial Club work; and also, in this same connection, of the splendid work of the county superintendents and the teachers. In fact, the Club work has been dependent very largely upon the activities of local people, principally school officials. This has made it possible to develop the work in this State in a very short time to a high degree of effectiveness. We have also enjoyed the hearty cooperation and support of the State Bankers' Association, the Oregon Development League, and many prominent men and women of the State.

The generous cooperation and support given to the Service by the railway companies has made possible a much more extensive service than could otherwise be maintained. All the railway companies of the State have granted transportation to the College representatives while performing extension work. As the service has grown, the demands upon the companies for transportation have reached very great proportions. During the past year the Southern Pacific Railway Company has also cooperated with the College in operating a special demonstration train through Western Oregon. It is sincerely hoped that the companies will be able to continue their cooperation in the future.

In the development of the work, the farmers' organizations, especially the Grange, the Farmers' Union and the Farmers' Society of Equity have been most helpful. Their membership is drawn very largely from

the more progressive farmers in the various communities, and consequently their cooperation is of particular value. The Extension Service is anxious to receive their continued support and particularly invites their advice in the direction of the extension service. The entire purpose of the service is to serve the people of the State and, in a large measure, the farmers. For this reason, we are very anxious to have their advice and sympathy. If they will continue to cooperate with the College representatives, it will make a working arrangement which will be most effective in attacking our agricultural problems.

Respectfully submitted,

RALPH D. HETZEL,

Director.

REPORT OF THE SCHOOL OF HOME ECONOMICS.

To the President of the College,

Sir: I have the honor to submit to you the following report relating to the School of Home Economics, which heretofore has been denominated the School of Domestic Science and Art.

The change in the name of the school became effective September 1, 1914, and is in agreement with the report made by the committee on Instruction in Agriculture to the Association of American Agricultural Colleges and Experiment Stations. The new title places the school in line with other similar schools in Land-Grant Colleges.

Student Enrollment. The increased student enrollment has been most satisfactory. By reference to the last previous report, it will be observed that an estimate for the year 1913-14 was placed at 325 students in the regular courses in Home Economics. By a peculiar coincidence the actual enrollment for that year was 326.

A most encouraging fact was that at least 90 per cent of those entering this school had completed a full four-years high school course. With better student preparation, a much better type of college instruction becomes possible.

The records of the year 1914-15 will show at least 400 women enrolled in the classes in Home Economics, while 500 is too conservative an estimate for the year 1915-16. There is every reason to expect this rapid increase to continue for a number of years, since there is no rival institution on the Pacific Coast proving so attractive. A constantly increasing number of students are attending from the neighboring states of California, Washington, and Idaho; and young women are coming from distances as great as Indiana and Kansas.

Graduates. As a result of previous adjustments of courses, there were but 21 graduates in June of 1913, but the June class of 1914 numbered 46 in Home Economics. Of these 30 have been elected to teaching positions, with salaries varying from \$75.00 to \$100.00 a month. Many of the others did not desire to teach. Almost all positions as teachers of Domestic Science and Art in the State are now filled by graduates of this school and their success is most gratifying.

It is especially desirable that new fields of endeavor be opened to our graduates, and that they be prepared for these; with this end in view, certain modifications of the courses in Home Economics have been made.

Resume' of Courses of Study. The courses in Domestic Science and Art were administered during 1913-14 on the same lines as during the

previous year, but some minor changes were needed in arranging the work for 1914-15 owing to the raised entrance requirements. During the past few years students have been expected to specialize in either Domestic Science or Domestic Art from the beginning of their Junior year. Under the new plan there will be a well-balanced course of required work up to the close of the Junior year, with liberal electives in the Senior year.

There has been a constant demand from many parts of the State for a course of less duration than the degree courses, that would train for efficient home making. Such a course we now have; and while it greatly increases the work and responsibilities in the Home Economics School there can be no question of its success. Forty women entered this course when the work was started for the first time in September, 1914, and their enthusiasm continues unabated. Four mornings each week are spent in food preparation and in discussions relating to the purchase and economical use of foods. Four afternoons are occupied by lessons in sewing and in the study of textiles. Household linen, under garments, and dresses are worked upon; and the lectures include discussions relating to the manufacture and wearing qualities of fabrics. Special attention is given to house sanitation and the care of the home, to the care of children, and the care of the sick. So popular has the course proved, that it may be necessary to raise the age of eligibility for entrance in order to limit the numbers enrolling.

Special instruction is now being offered in Institutional Management and in Cafeteria Service. These two fields offer splendid opportunities for trained women, and at present are poorly supplied with untrained workers.

Mrs. Brooks, Professor of Domestic Art, makes the following recommendation concerning a Trade Course for Dressmakers:

"The apparent need for seamstresses and dressmakers in Oregon makes it advisable at this time to consider the introduction of trade courses that will fit a girl, after one year's attendance, for immediate service. The lack of room in the new building makes it impossible to inaugurate such a course this fall—with the opening of the second semester it is hoped that such a course may be started, if a room can be provided. The idea would be to start a class in September and one in February, so that we could launch a class for the fall and spring trade."

Night classes for women have been so popular that double sections have had to be organized and the Camp Cookery classes have required the evening attendance of two teachers. The Winter Short Course of 1914 was so largely attended that many of the regular classes were of necessity shortened that these students from the outside might be accommodated in classroom and laboratories. Farmers Week also found many women in attendance. In such emergencies, both in order to relieve the local teachers and to awaken a greater interest, the use of outside lecturers is recommended.

Summer School Classes. Almost all women students who attended the Summer School enrolled in courses in Home Economics. It is the desire of the faculty of this school greatly to widen the scope of the work offered in the summer session, and to raise it to the standard of graduate study for our own and other college graduates. It may be necessary to obtain special instructors for this session, owing to the fact that our regular teaching force is greatly fatigued after the regular year of work.

Extension Work. During the earlier part of this biennium all extension work in Home Economics was done by the regular teachers. This added to the usual burdens of the teachers and in a degree lessened their classroom efficiency, but the arrangement had certain advantages of too great importance to be overlooked. Of inestimable value is the knowledge of the State, of home conditions of the students, and of opinions and desires of parents, gained by the teacher who goes out upon extension service.

In July 1913 a regular extension teacher in Home Economics was employed. This arrangement diminished the outside demands upon the College teachers, but so rapidly has state-wide interest in Home Economics developed, that much service in the field is still required of the regular teachers. Seven instructors have given part time to this outside service.

Many requests for correspondence courses relating to household matters have been received, and it is the desire of those in the School of Home Economics to cooperate with the Extension Service that such courses may be established.

Personnel of the School of Home Economics. No considerable changes in the teaching force have occurred during the last two years. One additional teacher was restored to the Domestic Science department in the fall of 1913, by the return of Miss Ruth Smith from a year's study in New York. One additional instructor, Miss Bertha Davis, has been employed to take charge of the Home-Makers' Course and Miss McCall, resigned to be married, has been replaced by Miss Christie Moore.

In Domestic Art, Mrs. Olivia Schilling assumes the duties carried by Miss Barbara Moore, the latter having gone to New York for study; Miss Helen Peer takes charge of certain new work together with that which was heretofore handled by Miss Elta Raber, who resigned for further study; and Miss Cora Platt has been called to assist with the general increased teaching.

The success of the School of Home Economics has resulted in great part from the devotion and united efforts of its corps of teachers. Real growth can only be attained where definite policies exist, and an unsettled teaching force can never bring about such a condition.

The burden of responsibility has been divided as equally as possible, but has been extremely heavy in all cases; and long-continued, effective, and enthusiastic teaching can not be expected from over-worked people. A larger teaching force, with a vacation long enough for advanced study and real recuperation, is an absolute necessity; otherwise the teachers will cease to progress and will lose interest in their duties.

Additional Instructors Required. In Domestic Science two new teachers will be needed in the fall of 1915. This is partly because of increased student attendance and partly because the administrative duties of the Dean's office have increased so rapidly that part of the teaching heretofore combined with the office duties will have to be carried by other instructors.

The Domestic Art department will also require additional teachers—two or more instructors in case the Trade course is instituted, and probably two under ordinary conditions of growth.

A well-trained woman in Institutional Management will be needed to give requisite instruction and to administer the affairs of the cafeteria.

Salaries. If the integrity of the present faculty of the Home Economics School is to be maintained, a decided increase in salaries will be necessary. The instructors have been giving splendid service and their value is recognized by other institutions. Permanency of the teaching force is the most desirable of conditions, but this cannot be attained with dissatisfaction of salaries. Loyal service results from the conscious recognition that continued devotion to duty and increased efficiency is rewarded by adequate remuneration.

New Home Economics Building. The first wing of the New Home Economics Building was completed in the fall of 1914. This excellent structure adds greatly to the comfort and convenience of both students and teachers. No better accommodations are afforded any school of Home Economics west of the Mississippi River and no school in the entire United States has better or more suitable equipment. There are more expensive buildings and more elaborate equipment in some other institutions, but none which so thoroughly meets the needs of the students and so facilitates the teaching of the subjects grouped under the head of home economics.

So rapid has been the growth of this school that by the end of another year every portion of this splendid structure will be used every hour of the day and the imperative need of the completion of the entire building will be felt. The present wing was not designed to accommodate permanently the lecture classes, nor to afford ample office room; since it is expected that the center section will afford this type of space; hence, the central administrative portion of the building is greatly needed.

The center section will provide adequate class room, an increased number of offices, a much needed assembly room, which will accommodate large meetings of women, and which can be converted into a banquet hall when so required. Provision must be made for senior women to have practical household experience. It is desired that an apartment be provided in this administrative section for the establishment of a model home wherein the students may work under conditions as nearly those of a real home as possible. Many problems in housekeeping could thus be solved.

Work of this kind is being done in many of the best institutions; Pratt Institute has a city dwelling, Teachers' College a typical apartment or flat, Wisconsin University, University of Illinois, and the Agricultural College of Iowa each have residences of ordinary home size.

In these houses the women of the various schools work out the home problems. At present no provision is made for such instruction in this institution, but it must be made, if we are to keep abreast of the work given by other schools.

The completion of the west wing will afford ample room for the large classes in Domestic Art, and their removal from the present wing will afford room for the needed expansion in the Domestic Science department. The new wing could be planned to accommodate the women's classes in Art and place them closer to the Domestic Art department to which they are allied.

New Departments. Some slight readjustments and re-classification of work is deemed advisable. Much of the Art work now given in the College is entirely for women. It is closely related to the problems in Home Decoration, Basketry, Costume Design, and Handwork and Weaving. It is respectfully suggested that a department of Applied Design be created in the School of Home Economics. This department should include the freshman courses in Art now required in the Home Economics School, and such other courses as design, metal work, china painting, basketry, costume design, and house decoration.

Home Administration is receiving increased attention among all students of Home Economics, and as soon as the center section of the new building can be completed, this line of study will merit recognition by the organization of a department of Home Administration.

The School of Home Economics should be organized to have four divisions instead of two as at present, these being Home Administration, Applied Design, Domestic Science, and Domestic Art. This division would increase the efficiency of organization and prepare for the certain rapid growth.

Equipment. The present equipment is all that could be desired in quality and type. With the opening of the cafeteria, the establishment of a practice home, and the construction of the new wing for Domestic Art, however, a considerable amount of new equipment will have to be purchased.

With a strong, loyal, thoroughly prepared teaching staff, the unvarying support and assistance of other College departments, satisfactory housing conditions for the students, and a commodious and well-equipped Home Economics building, there can be no question of the position this school can maintain when compared with other institutions.

Experimental Work. It is eminently fitting that the School of Home Economics carry out a series of experiments relating to home problems. So little actual information exists concerning household matters that a great field is open to some institution to establish a department of household experimental work and to publish the results of their investigation.

Exhaustive studies relating to the cooking qualities of various Oregon apples at different seasons of the year, have been carried out, and the results published both in a technical and a popular form. Studies relating to pears and also uses of loganberries, are now under way.

Plans are made for experiments with the common Oregon fuels, to determine their comparative economy and efficiency; and other work will be done with various "labor-saving" devices. Limited funds and insufficient help prevent the extension of this experimental work; but with these difficulties removed, great opportunities for service will be afforded. The full-time service of a truly scientific woman should be devoted to this work, with sufficient funds for materials, labor, and equipment, to place the department on a par with the various agricultural experimental departments.

Clerical Work. An increasing volume of correspondence is coming to the office of the Dean. The women of the State are availing themselves of our willingness to reply to all inquiries relating to home matters. This is as it should be; but it entails many hours of office work. Files have been prepared for all bulletins received, a system of records relating to graduates and their occupations and salaries is developing. A complete file of all extension lectures is maintained for future reference and facts relating to student matters are in orderly and accessible form. It is necessary that the clerical force be increased, since under present conditions only the Dean has the time of a stenographer. Other members of the faculty have many occasions for business correspondence as well as for preparation of material for publication, and should have clerical help at their disposal.

State Service. Members of the faculty of the School of Home Economics have actively interested themselves in State and National organizations. They have prepared papers, presided at meetings, and served on committees. By these various means the instructors have widened their influence and increased their efficiency.

Respectfully submitted,

HENRIETTA W. CALVIN,

Dean of the School of Home Economics.

REPORT OF THE SCHOOL OF FORESTRY.

To the President of the College,

Sir: In common with nearly all the Forest Schools of the United States, the course of study of the School of Forestry of this College was primarily shaped to prepare men for work in the Federal Forest Service. This was the natural thing to do, since the Federal Service was practically the only agency supplying employment to technically trained foresters. Nearly all of the men who have left the School during the past four years are employed in some branch of Federal forestry work.

Courses in Logging Engineering. During the past two years, however, the more progressive of the timbermen of the State have become convinced that the industry they represent can be greatly benefited by the service of men specially trained to meet the peculiar requirements of the timber business. The School of Forestry, cooperating with a committee from the Pacific Logging Congress, an organization of all of the prominent timbermen of the Pacific Northwest, worked out a course of study designed to prepare young men for service in getting timber from the woods to the mills. This Logging Engineering course received the official approval of the Board of Regents last year. In the development of this course it will be the policy of the School of Forestry to keep in close touch with the leading lumbermen of the State to the end that it may meet as fully as possible their special needs. For valuable assistance along this line the School of Forestry is greatly indebted to J. S. O'Gorman, H. C. Clair, J. C. Van Orsdel, J. D. Younge, and Geo. M. Cornwall.

Three Fields of Work. As at present organized, the School of Forestry has two distinct lines of work. The first deals with the reproduction, protection, and care of the forest. The second has to do with harvesting the mature crop. Coordinate with these two departments should be a third, the utilization of timber. This course should deal with the manufacture of lumber, and the marketing of the manufactured product. Considering the immense amount and great value of the forest crop of Oregon, it is clear that the College has an opportunity to render great service to the State in preparing men to get the most material of the highest value out of our timber resources.

Growth of the School. The following figures, beginning with the College year 1909-10, indicate the increase in the enrollment of the School of Forestry:

1909-10	22
1910-11	31
1911-12	38
1912-13	67
1913-14	86

These figures show a very lively interest in forestry work generally. That the numbers in the School have increased is a matter of surprise, in view of the competition of other forest schools, housed in adequate buildings and supplied with the necessary equipment, making known their advantages through special forestry publications.

Oregon's Opportunity in Forestry. I believe this College should have the largest and best forestry school in the United States. Oregon has more standing timber than any other state in the Union. Practically one-fifth of the timber remaining uncut throughout the country is within the borders of our State. Yet, while other industries and professions have received recognition at the College by the provision of suitable buildings and equipment for their peculiar needs, the timber industry, as represented by the School of Forestry, remains practically without suitable housing or equipment. If the College is to play the part it should in preparing young men for efficient service along all industrial lines, proper provision should at once be made for caring for the forestry work. Failure to do this will seriously impair the efficiency of the service which the College can render to the State.

Employment of Graduates and Students. It is a matter of great satisfaction to note that every graduate of the School who desired to follow the profession of forestry, has found satisfactory employment. Some of our graduates are connected with the State work, some are in the Federal Forest Service, while others are employed by logging and milling companies. The School is fortunate in that the most cordial cooperation exists between it and the lumbermen and Forest Service. Nearly every member of the School, including students in the freshman class, have been able to secure employment during summer vacations. This not only aids the men in securing money to defray College expenses, but,—and this is decidedly important,—it gives them practical field experience that is of inestimable value as a supplement to college work. The personal interest which the most prominent practical loggers of the Northwest are taking in providing employment for forestry students, is a hopeful sign that the School of Forestry is playing a part, however small, in increasing the efficiency of those who are engaged in the lumber business. More than 20,000 men are engaged in the timber industry in Oregon. The School of Forestry can, and should, provide the leaders for this industrial army.

Need for Building and Equipment. To do this, buildings and equipment must be provided. Without these, instructors are at a disadvantage; for they are without the means of imparting instruction in the most efficient way. Without them, our students are at a disadvantage because they do not receive the preparation required by other properly equipped schools. Without them, in short, it is impossible to do efficient work.

Summary. The original aim of the School was to prepare men for the Federal Forest Service. During the past biennium, by reason of the initiative and cooperation of the practical timbermen of the Pacific Northwest, this aim has been broadened to include the preparation of

students to harvest the timber crop. It should be still further extended to include instruction in the manufacture and marketing of lumber. The growth of the School of Forestry since its establishment as a College department in 1909, has been remarkably constant and cumulative. This growth, together with the unequaled timber resources of the State, points to the conclusion that Oregon's peculiar and distinctive opportunity is leadership in Forestry. This leadership, however, is dependent upon the provision of adequate buildings and equipment to insure efficient demonstration and instruction.

Respectfully submitted,

G. W. PEAVY,

Dean of the School of Forestry.

REPORT OF THE SCHOOL OF ENGINEERING AND MECHANIC ARTS.

To the President of the College,

Sir: I have the honor to submit to you the following report of the School of Engineering and Mechanic Arts for the biennium ending June 30, 1914. I feel that the past two years have marked a substantial advance in the work of this school. The work in the various departments of the school has been improved and standardized in accordance with the best practice of technical schools. The faculty have been working together in harmony for the best interests of the College, and particularly for the advancement of the engineering departments. The better preparation of our freshman students noted in my last report, has been an important factor in the successful work of the past two years. No radical changes in the courses of study have been in operation during the past two years, but a number of important changes are to go into effect with the opening of the College in September, 1914.

Equipment. During the year just closed the expenditures for equipment in the School of Engineering have been as follows:

Civil Engineering	\$ 342.05
Electrical Engineering	1296.74
Mechanical Engineering, including the shop and laboratories.....	5356.82
Total.....	\$6995.61

The greater part of the amount accredited to Mechanical Engineering was used to install and equip a steam engineering laboratory at the heating plant. Among the items in this laboratory may be mentioned, a corliss engine, steam tribune, compound engine, and a surface condenser.

Student Enrollment. The total enrollment of students in the courses of the School of Engineering is practically the same as it was two years ago as shown by the Registrar's records quoted below.

Degree Course—	1911-12	1913-14
Civil Engineering	71	63
Electrical Engineering	68	74
Mechanical Engineering	61 200	98 235
Secondary Course—Mechanic Arts	61	33
Total.....	261	268

It will be noted from the statement above that the number of students taking the degree courses has increased 17.5 per cent, while the number taking the secondary courses has decreased 46 per cent.

Faculty Changes. Prof. G. V. Skelton, head of the department of Civil Engineering, was placed in charge of the department of Highway Engineering at the beginning of 1913-14. It is our purpose to advance and build up this work as rapidly as possible. Two lines of work will be followed,—one representing the engineering educational side, and the other, extension service among the people of the State. For the present, Professor Skelton will divide his time between these two lines of endeavor.

Last November, Professor E. P. Jackson, who had charge of the woodworking department, including both College class work and the manufacture of equipment, resigned his position as Professor of Technical Woodwork in order to devote his full time to the manufacture of equipment and the superintendency of the College buildings. This relieved a situation that had long been unsatisfactory, on account of neglect of College class work for work on equipment and repairs.

C. L. Knopf, who had been in charge of the machine shop for a number of years, was last February transferred to the testing laboratories of the department of Experimental Engineering, the purpose of the transfer being to increase the efficiency of the service in both shop and laboratory. At the same time, Mr. Buyers, who had been appointed instructor in the engineering laboratories in September, 1913, was transferred to the machine shop; ill health, however, prevented him from entering upon his new duties, and later he resigned.

New Appointments. T. A. H. Teeter was appointed Assistant Professor of Civil Engineering, and assumed his duties early in September 1913. His work covers the subjects of irrigation, water supply, water power development, drainage, and other problems coming under hydraulic engineering. During the past year, however, it has been necessary for Professor Teeter to carry some of the other work in civil engineering, in order to equalize the work of the department.

H. C. Brandon, formerly principal of the Portland Trades School, was appointed Professor of Industrial Arts and Director of the Shops in November, 1913. This appointment was made on account of the transfer of Professor E. P. Jackson to the superintendency of buildings.

At the April meeting of the Board of Regents, Professor R. H. Dearborn, head of the department of Electrical Engineering at the University of Oregon, was elected Professor of Electrical Engineering at the College to begin his duties July 1, 1914. Professor Dearborn will devote the larger part of his time, as heretofore, to the work of the Public Utilities Commission. The increase in magnitude and diversity of work has made it necessary to add several new instructors for next year as follows:

In Civil and Highway Engineering, D. R. Smith.

In Experimental Engineering, R. R. Boals.

In Industrial Arts, W. F. Maddison in the machine shop, and one not yet selected, in Electrical Construction.

Non-Resident Lecturers. It has been the policy of the school to provide a number of lectures each year, by non-resident professional men, for the more advanced students in the several engineering courses. During the past year a number of men in positions of responsibility in the work of engineering, railway and power operation, and the State service, have addressed the students upon subjects of special interest to the profession.

Great benefit has been derived from these lectures. The expense has been merely nominal, never amounting to more than the actual expenses of the speaker. The advantages derived from personal contact with these dynamic workers in the field of practical engineering, however, has been beyond price. It is our intention to continue the lectures, and widen their scope if possible.

New Courses. By order of the Board of Higher Curricula, the course in Civil Engineering is subsequently to be discontinued, but courses in Highway Engineering and Irrigation Engineering are offered as degree courses, leading to the degree of Bachelor of Science in Highway Engineering and in Irrigation Engineering respectively. The two-year secondary course in Mechanic Arts has been abandoned and in its place a three-year vocational course in Mechanic Arts has been established. This course is intended to meet the needs of young men who are unable to take a degree course in College, but who desire educational training above the eighth grade which shall fit them for specific vocations or trades. Outside of the city of Portland, where the Trade School fills this function, there is no provision made in this State for the very large number of young men who are annually leaving the eighth grade and taking up the duties of life in the trades, to continue their education with special reference to their chosen work. We believe that the College has a duty to perform towards these people, which it can only fulfill by offering them advantages afforded by this vocational course.

In addition to the new courses already mentioned, the courses in Electrical Engineering, Mechanical Engineering, and Industrial Arts have been greatly improved and strengthened in accordance with the higher entrance requirements which are to go into effect in Sept., 1914, and in Sept., 1915. This is not to be accomplished by adding a large number of subjects to the courses, but by concentrating upon those already given. The number of semester credits having been reduced to 16, this will make it possible to do more thorough work.

Highway Engineering. The work in highway engineering is being taken up, both with reference to College work and extension service, with a view of preparing young men to enter this somewhat new field of engineering work, and also to assist road supervisors and others in building and maintaining, to best advantage, the roads under their care. Probably in no other line of public work has there been so much economic waste as in the building and maintenance of the country roads. In this State we are just now taking cognizance of fact, and beginning the construction of permanent highways. It is hoped that the College will

turn out graduates who will be capable and efficient in promoting and supervising this important work. It is also our desire that the extension service in this department should reach every part of the State and render assistance in building and maintaining better earth roads, which after all must be depended upon, for many years to come, as the principal thoroughfares of the rural districts.

Irrigation Engineering. The development of irrigation projects in our own and adjoining states, makes it imperative that more attention be given to irrigation engineering, than heretofore. Hence a separate department has been established to deal with the engineering side of irrigation work and other hydraulic enterprises, such as water supply, drainage, and power development. By training men to enter this service, whether under the direction of the State Engineer, or in private enterprises, we believe we are but fulfilling a duty imposed upon us by the natural conditions existing in our State.

Industrial Arts Department. As it is now organized, this department includes all of the shop instruction given in the College. It also offers a degree course in Industrial Arts for those who wish to prepare themselves to teach or supervise manual training work in the high schools or lower grades of the common schools. It is hoped that the transfer of the Industrial Arts course from the department of Industrial Pedagogy will unify and strengthen the work, without in the least detracting from the value of the pedagogic training afforded by the course.

Service Departments. While all departments in the School of Engineering act as service departments to each other, there are two lines of work in which service to other departments is the principal function. These are the engineering laboratories and the shops. The work of these two departments is by no means limited to the Engineering School, but touches many other departments in the College.

Experimental Engineering. The engineering laboratories have hitherto been conducted as a part of the department of Mechanical Engineering, but have been equipped and operated in such a way as to serve the needs of Civil, Mining, and Electrical Engineering, as well as the School of Forestry. By this means duplication of equipment and work in different departments has been avoided, and better service rendered to all than would have been possible had engineering laboratories been established in each of these departments. I believe the results obtained fully justify a continuation of the plan. In order to give the work more independent recognition, and increase the efficiency of the organization, the department of Experimental Engineering has been established and charged with full responsibility for the continuation of this service.

Shops. The shops are now well organized under the department of Industrial Arts, and as soon as one or two vacancies in the instruction force are filled, it is believed that this important adjunct to the engineering school will be in better condition than ever before to render efficient service to the various departments of the College. The addition of the vocational work should greatly increase the efficiency of the shops

without increasing the cost of maintenance; since the equipment will be in use during a greater part of the time. Better results will also be obtained in building equipment and apparatus for the College.

More Room. The question of additional room for the Engineering School has been mentioned in former reports, and all that has been said there still holds true. There are now additional reasons, indeed, why this matter should receive early attention.

The discontinuance of engineering courses at the State University, will not only greatly increase the number of students taking up engineering at the Agricultural College, and thus demand more room for their accommodation, but it also makes the College the official engineering school of the State and places the full responsibility upon it. In accepting this responsibility we should provide the necessary room and equipment to maintain our position with efficiency and dignity. Another reason why more room is needed at once is the fact that the engineering laboratories have been obliged to distribute their equipment through three different buildings, in order to find shelter for it;—the materials and cement laboratory in Mechanical Hall, occupying room needed by other departments; the gas and compressed air equipment, in the old power house; and the steam laboratory, temporarily installed at the heating plant on the south side of the campus. The apparatus of this department should be grouped together in a building designed for the purpose, where the different lines of work could be carried on simultaneously under the direction of the department. Such a building might accommodate other work, and relieve pressure in other departments, but the leading feature should be the engineering laboratories. I sincerely hope that funds will be available for this purpose before the close of the present biennium.

Respectfully submitted,

G. A. COVELL,

Dean of the School of Engineering.

REPORT OF THE SCHOOL OF MINES.

To the President of the College,

Sir: I have the honor to submit the following report concerning the School of Mines since its organization up to June 30, 1914.

BRIEF HISTORY OF THE MINING DEPARTMENT AND BUREAU OF MINES.

For the past six years the department of Mining Engineering has been one of the departments of the School of Engineering. In any state where mining is an important industry the work of mining engineering is more closely allied with an important basic industry or fundamental source of wealth than other engineering branches. This fact coupled with the additional fact that Oregon's mineral development is, and has been, quite backward, made it necessary for the Mining Engineering department of the College early to undertake, as its chief work, the investigation of the State's mineral resources. Since this work bears very little relation to the work of the other engineering departments, it was thought best to segregate the Mining department from the School of Engineering and establish it as a separate school. This change in the organization of the engineering work of the institution was made on July 19, 1913, when the Board of Regents authorized the establishment of the School of Mines.

The 1913 legislature passed a bill providing for the investigational work of the State, to be governed by a commission to be known as the Oregon Bureau of Mines and Geology Commission. This statute carried an appropriation of \$40,000 for the first two years and authorized the Commission to appoint a director and staff to continue the investigational work along mining lines already inaugurated by the Mining department. This Commission appointed the Dean of the School of Mines Director of the Bureau, and, upon his nomination, appointed the complete Bureau staff.

This is a very important mile-stone in the development of the investigational work in connection with the mining industry of Oregon, since this act of the Legislature made available, for the first time, an appropriation which was adequate to cover the immense field of needed research. Oregon has been backward in her mining activities as compared with other states on the Pacific Coast, due largely to a lack of accurate knowledge concerning her resources. Now that the work of investigation is well started, we believe that it should and will be con-

tinued until the limits of the State's mineral resources can be adequately determined. The School of Mines must necessarily grow in direct proportion to the development of the mining industry, and the geological investigations which are being carried on will contribute largely to the growth of the mineral as well as agricultural and other industries of the State.

FACULTY OF SCHOOL AND STAFF OF BUREAU.

The law providing for the Oregon Bureau of Mines and Geology above mentioned stipulates that, as far as possible, the laboratories of the School of Mines be used for the investigational work of the Bureau. It was found desirable to employ, as far as practicable, members of the School of Mines faculty on the staff of the Bureau. In this way the School work and the Bureau work are kept closely interrelated and mutually helpful. At the present time the following members of the School of Mines faculty are employed jointly by the School and the Bureau:

Henry M. Parks, Dean of the School of Mines, Director of the Bureau of Mines and Geology.

Ira A. Williams, Professor of Ceramics in the School of Mines, Ceramist for the Bureau.

Arthur M. Swartley, Instructor in the School of Mines, Mining Engineer for the Bureau.

Sidney W. French, Instructor in the School of Mines, Metallurgist and Chemist for the Bureau.

George E. Goodspeed, Jr., Instructor in the School of Mines, Assistant Geologist for the Bureau.

G. M. Butler is employed full time as Associate Professor in the School of Mines.

DEPARTMENTS OF THE SCHOOL.

There are at present three authorized departments in the School of Mines; namely, Mining Engineering, Ceramic Engineering, and Chemical Engineering. The instructional work in the first two years of the degree course is identical in the three departments. At the beginning of the junior year, the School of Mines student has the opportunity to choose his major in either one of the three departments leading to the degree of Bachelor of Science.

Mining Engineering. The technical work in the department of Mining Engineering is designed to give the student thorough training in the essential fundamentals of the sciences of mining and metallurgy. The field for the mining engineer in the State is increasing rapidly, partly due to the steady development of the industry but more because of the intimate contact maintained between the active mining men and the School of Mines faculty through their investigational work. Such con-

stant contract accounts very largely for the evidences of confidence and support on the part of the mining men.

The Ore Dressing laboratory, which is just being completed, is used largely by the Department of Mining Engineering. This laboratory is being equipped with some of the more important units of concentrating machines, such as jigs, concentrating tables, and vanners, as well as a model cyanide plant, and numerous auxiliary pieces of apparatus at a cost of about \$1,500. This will make it possible, for the first time in the history of the School of Mines to do experimental and demonstration work along the lines of ore testing and concentration.

Ceramic Engineering. Ceramic Engineering is the application of chemistry and engineering to a well-defined group of non-metallic mineral industries; namely, clay-working, glass manufacture, and cement manufacture. These industries all produce silicate products, employing the same raw materials to a large extent, and thus constitute a natural division of chemical technology. The ceramic engineer should be something of a geologist and mining engineer in order to discover and work his raw material; he should be a mechanical engineer to prepare these materials and to manufacture them in the required shape; and he must be a chemist to understand what takes place in his kilns and furnaces. His course, therefore, while founded upon chemical technology, must be broad and varied and include a large amount of general engineering.

The work of this department is at present, and probably will be for some time, closely allied with the large amount of investigational work carried on by the Bureau of Mines and Geology. Such vital connection with the practical field and its problems, is especially valuable to the student, since it furnishes him an opportunity to see and to study larger and more varied phases of the ceramic industries than would otherwise be possible. The Ceramic laboratory occupies a commodious room in the basement of the Mines building and is equipped with full-size machines for making all kinds of ceramic products, including kilns for burning, also a complete set of apparatus for the analysis and testing of both the raw materials and the finished articles. This equipment has all been installed within the past year, at a cost of more than \$4,000, and is without question the best equipped ceramic laboratory west of the Missouri river.

Chemical Engineering. The course in Chemical Engineering has been prepared to meet the growing demands for trained men in the numerous industries which employ chemical processes prominently in their work and which are not included in the fields of metallurgy and ceramics. Among such may be mentioned the manufacture of acids, alkalis, salts, paints, dyes, soaps, glue, starch, sugar, preservatives, antiseptics, fertilizers, paper, artificial illumination and heating gas, and others. The demands along the lines of chemical engineering will evidently grow as the manufacturing industries suggested in the above list are developed. Since most of the work in Chemical Engineering is closely related to the metallurgical and chemical work of the School of Mines, it can be cared

for without the addition of a large amount of expensive equipment. It seems desirable, therefore, to develop this department as fast as the progress of the industries related to it in this State seem to warrant.

Geology. In the School of Mines there is really a fourth department, although at present no degree is offered; namely, the Geology department. The instructional work given in this department, including crystallography, blow-piping, petrology, mineralogy, and geology courses, are, with a few exceptions, given to all students in the School of Mines. The facilities and equipment in the Geology department are steadily being augmented by very helpful material. The close touch which the department has with the large amount of State investigational work, makes it possible to add materially to its collections and equipment both in quality and quantity.

It has been for some time a matter of regret to me that the Geology department in the School of Mines is not used more by the departments outside the School of Mines. We offer at the present time an elective course in Agricultural Geology; and I am strongly of the opinion that all agricultural students who take agricultural chemistry should have as an accompanying or following course, one in Agricultural Geology. With this combination, their chemical knowledge would be of much more service to them. It is possible for the student, with the three-credit subject offered in Agricultural Geology, to become familiar with all of the common types of rocks, as well as to gain an understanding of the processes by which those rocks break down into soils. I am thoroughly convinced, therefore, that the Agricultural student cannot afford to be without this fundamental course, which is right at his door.

There are offered, also, in the School of Mines, general geological courses which could be taken by students as general cultural training. In most institutions of this character the general geology subjects are quite popular with women students. It is my desire that everything possible should be done to make certain courses in the School of Mines as useful to the College at large as they should be.

BUILDING AND EQUIPMENT.

The new, commodious Mines building was completed in the fall of 1912. This building affords, for the first time in the history of the Mining department of the institution, adequate housing, and furnishes sufficient laboratory space for the different phases of its work. The larger part of the laboratories and equipment of the School of Mines is used in all three of the departments. For example, the crushing and grinding laboratory, assaying and metallurgical laboratory, as well as the mineralogy and petrology laboratories and draughting rooms, are used by all departments and students in the technical work in the School of Mines.

The equipment of the new Geological Museum has just been completed. It includes twelve glass-topped cases of attractive design, each nine feet long and two and one-half feet wide, and of the proper height

so that material contained therein can be easily seen and studied by the observer. In these cases will be placed systematized collections of the most attractive minerals and rocks that are available, which will be known as the School of Mines' Exhibit Collection. In the base of each of these cases are twelve drawers which will be used for filing different educational collections. In addition to these, there are fifty-five feet of wall cases, six and one-half feet high and about twenty-eight inches deep, also of attractive design, having the shelf space arranged in steps so that different-sized material can be shown to advantage. These cases will be largely used to exhibit manufactured products and art ware representing the ceramic, metallurgical, mining, and chemical engineering industries.

The total registration of students in the School of Mines for the year 1913-14 was as follows: fourteen freshmen, eight sophomores, four juniors, and three seniors.

Respectfully submitted,

H. M. PARKS,

Dean of the School of Mines.

REPORT OF THE SCHOOL OF COMMERCE.

To the President of the College,

Sir: I present herewith a report on the work of the School of Commerce for the past biennium, and the requirements for the next biennium.

INSTRUCTIONAL WORK.

The registration in the School of Commerce for the past two years has been 338. This enrollment keeps up the usual ratio between the registration in Commerce and the total registration of the institution. The enrollment in Commerce is usually about 10 per cent of the entire enrollment of the College.

There has been a remarkable growth in the Commercial work required of students in other departments. As a service department, the School of Commerce ranks first in the institution.

The alumni of the School of Commerce have been increased by twenty-four graduates during the last two years. The large number of regular students now enrolled in the lower classes points to a steady growth of the senior class. The success of the graduates in a great variety of vocations is very gratifying.

Regular Courses of Study. A number of important changes in the Commercial Courses will be found in the present College Catalogue as compared with last year's. This is due partly to our new entrance requirements, demanding three years of high school credits for 1914-15, and partly to the fact that the Board of Higher Curricula limits the work of the School of Commerce to undergraduate courses, except in the field of Rural Economics. Every effort has accordingly been made to make each course as practical as possible, with special reference to the various industrial departments of the College. Eighty-two courses will be offered next year.

New Courses. The School of Commerce has been a consistent advocate of the development of farmers' business courses on a more extended scale than is found in any other school, with the possible exception of the University of Wisconsin. I believe that the time has come when a special degree course should be offered to be known as the Farmers' Business Course, where considerable latitude should be given in the selection of courses throughout the entire four years of college work. No restrictions should be placed on this course; there is no reason why the advanced degrees should not be offered. A number of additional courses will be required in Rural Economics, Farm Management, and Business Administration, which cannot be outlined here.

Winter Courses. The work offered by the School of Commerce in the Winter Short Courses has not met with the encouragement in attendance that was expected. This is probably due largely to the great number of courses offered, and also to the fact that thus far an attempt has been made to give considerable laboratory work. An attempt will be made next year to condense these courses into a few lectures by each department, and to leave the practicums to be worked out by correspondence. An effort will also be made to conduct a lecture course for business men in connection with the short course.

EXTENSION WORK.

Correspondence Courses. The correspondence courses in Farm Accounts and Business Methods, Rural Economics, and Rural Law have been offered with very satisfactory results. Fifty-eight students have enrolled since my last biennial report. A second edition of my bulletin on Farm Records has been exhausted and a third is being prepared. In 1913 Dr. Macpherson wrote a significant and timely bulletin on Practical Problems in Rural Economics, and Regent E. E. Wilson is at present preparing a bulletin on Rural Law, a revision of a series of lectures which he has given at the farmers' short courses. Several other bulletins on the Business Side of Farming are planned and will be ready for the press in the near future.

In addition to his regular College duties, Professor Macpherson has given a great deal of his time and energy to Extension work. This included meetings of committees such as the Oregon Problems Committee appointed by Governor West, committees of farmers' organizations, and a joint committee representing the State Grange, Farmers' Society of Equity, Farmers' Union, and Oregon State Federation of Labor. Then, too, he delivered some thirty lectures, at which there was an approximate total attendance of 4,000 people, exclusive of the attendance at lectures given during Farmers' Week and the Short Course at the College.

Bureau of Markets. It is the aim of the department of Economics to "develop a practical system of aid in the formation of all kinds of farmers' organizations." The problem of marketing farm produce is receiving increasing attention by both the State and Federal governments. The great farmers' organizations are asking for assistance in the solution of this important problem. It is the aim of the department of Economics to be of the utmost possible service in helping to carry on this work in Oregon.

The Oregon Statistical Bureau, under the direction of the Dean of the School of Commerce, completed the work assigned to it by law in the Spring of 1912, and as a result of its work an exhaustive report entitled "The Oregon Farmer" was published by the Oregon Immigration Commission in an edition of 25,000 copies. Unfortunately, no appropriation was made by the last legislature for continuing the work.

The Bureau should become a part of the proposed new Bureau of Markets.

An extract from Doctor Macpherson's Report gives an outline of the plans and purposes of the Bureau: "The Bureau contemplates attacking certain definite problems during the coming year, with certain of these as major problems, and the others as supplementary. We may outline tentatively the proposed field of activity for the next biennium under the following heads:

- (1) Rural Organization
- (2) Business Efficiency
- (3) Surveys of Methods and Costs
- (4) Business Propaganda.

Under each of these heads, we propose to accomplish something definite each year.

"(1) Rural Organization: In this field, we propose to cooperate with the leaders in the rural organizations in establishing and perfecting the 'Oregon Farmers' League,' which shall be a federation of all organized farmers. In the establishment of local business units, we shall endeavor to assist any neighborhood or group of farmers calling for assistance. It appears to me, however, that for the special task which we shall push aggressively throughout the year, we shall single out the organization of Farmers' Exchanges at convenient shipping points throughout the State for the purpose of grading, packing, and shipping in good shape the products of the adjacent territory.

"(2) Business Efficiency: The work in this division will cover considerable scope. It should begin with the individual farmer, and encourage in every way possible, through the County Agriculturists and through occasional visits by our accounting expert, the keeping of accurate farm records. These records could be worked out on the individual farms as part of the laboratory work in Dean Bexell's course in Farm Accounting, or might be undertaken by any farmer having the necessary training in accounting. Such sets of accounts might cover the operations of the whole farm plant, or they might be undertaken in a much simplified system for single farm products, such as potatoes, hogs, dairy cattle, etc. These single crop records, it seems to me, could very profitably be made a part of the work of the boys' and girls' clubs now being organized all over the State. The results obtained in this way would greatly build up at the College a body of reliable data on the actual results obtained on Oregon farms. In order to get this material, the College could well afford to supply blank forms and paper for bookkeeping sets on condition that the records be kept in duplicate, one copy to be furnished the College at the end of each business year.

"Besides the work with the individual farmer, the Bureau proposes to work towards a uniform system of accounting for all farmers' organizations. Our accounting expert should be put to work immediately upon the problems of creamery accounting, cannery accounting, warehouse bookkeeping, etc. Here again it is proposed that we furnish organiza-

tions with blank forms for a series of reports running from month to month, and from year to year, so that the progress of each organization can be definitely followed and checked up.

"(3) Surveys of Methods and Costs: In addition to the material received through our accounting systems, it will be necessary to gather certain data at first hand through out accounting expert, or through the various members of our extension staff, our Station staff, and superintendents of branch experiment stations. An example of what we should do is our Potato Cost of Production Survey, which we are undertaking now. We have obtained a considerable number of schedules filled out. If we could put a man in the field for about two weeks, we could finish this one matter, and check up at first hand on the results which we have gathered in from a variety of sources. One of the cost-survey problems which we could undertake is a cannery survey, covering the complete operations of the canneries of Oregon for the season of 1914. This would give us a mass of invaluable information in estimating the future possibilities of canneries, driers, and vinegar plants in taking care of the by-products of our fresh-fruit industry.

"(4) Business Propaganda: No improvement in the present farm business methods can be accomplished without persistent educational effort. The people of the State must have their interest aroused. We must keep at them until a desire to cooperate for economic and other purposes becomes firmly rooted. We can accomplish this by lectures before all kinds of farmers' meetings, and the various farmers' organizations of the State. We can do something towards it by means of bulletins and press notices. We can probably do most towards bringing it about by personal contact with the leaders in local organizations, convincing them of the advantage of our plans, and in turn, letting them work with the members of the organizations in which they are leaders. Then, too, a few successful organizations in every county will go a long way towards popularizing better business methods.

"In the following estimate of expenses for the coming biennium, I have included one stenographer and office assistant at a salary of \$55 a month for the first year, and \$60 for the second year. We should have, I think, one of our own graduates, trained in commerce, who can take charge of the classification of survey schedules, sets of accounts, and everything else coming into the office, besides attending to correspondence. We have in view two young ladies at the present time who would answer these requirements very well, indeed.

"I have placed next an accounting expert, who would also work upon cost surveys, and in devising simplified account systems for farmers, as well as various types of business and industry coming within the scope of our office. I have estimated that we could obtain such a man for \$1300 for the first year, allowing \$100 raise for the year following.

"The next in our labor force should be the marketing expert. The salary for which we would be able to obtain a man for this position would depend entirely upon his ability, experience, and college training.

I have placed the estimate at \$1800 for the first year, and \$2000 for the next. Of these amounts one-half will be paid by the National government.

"The next item, including printing, paper, accounting forms and books, I have placed at \$300 a year. Besides, we should have one, or perhaps two, new office desks at \$28.50 each.

"I have not included traveling expenses in this estimate, since much of our work done in the field would, it seems to me, come either under Extension or Experiment Station work, and it would appear that these divisions of College activity should continue to bear that expense."

THE FACULTY.

There are ten members in the present faculty of the School as follows: department of Business Administration, J. A. Bexell, E. B. Lemon, R. M. Howard; department of Economics, Hector Macpherson and E. J. Brown; department of Political Science, U. G. Dubach, Chester Maxey, J. B. Horner; department of Office Training, C. I. Blanchard, and Neil Baldwin.

Additional Help Required. In my report on the departments of Instruction, you will see that a very much heavier demand will be made on the School of Commerce next year by other departments of the College. Laboratory work is more than doubled. There will probably be an increase of at least 50 per cent in the number of students doing work in the School of Commerce. Some relief is given us by the departments of Mathematics and English, who will take over the Commercial Arithmetic and Business English, respectively.

The minimum additional help required for instructional work next year is two instructors. One instructor, classified as Instructor in Political Science, will do part work in Economics; another, classified as Instructor in Accounting, will give about one-third of his time to Economics. The Bureau of Markets will require at least two full-time, high class, men, and a stenographer.

A stenographer should be employed to do the clerical work of the School and to assist in the work in correspondence instruction. We can secure a fairly competent beginner in stenography at \$50 a month. The Extension Service has agreed to bear half the expense of this stenographer, in consideration of the work in correspondence instruction and extension work by the School.

DEPARTMENTS.

Business Administration. The work of the department of Business Administration consists of twenty-four courses in various subjects relating to Business Management, Advertising and Selling, Accounting and Auditing, Farm Accounting and Business Methods, and Home and Private Finance. Farm Accounting is given in four sections and Home and

Private Finance in four. Four hundred thirty-nine students were enrolled in the various courses during the first semester last year, and 293 during the second semester. Approximately one-half of the work is given by the laboratory method, which requires a much larger proportion of the instructor's time in the classroom than the lecture method.

Economics. Extracts from Doctor Macpherson's Report: "During the year, seventeen different courses were offered in the department, in which there was a total attendance of 566 students. Besides the regular work of the department, courses of lectures were offered during Farmers' Week and the Short Course. These courses, covering in a general way the current economic problems of Marketing and Farm Credits, as well as three special lectures by Dr. Brown on such general problems as the Currency Law and Income Tax, were well attended.

"A special feature of the year has been an attempt to establish our Commercial Museum as an efficient auxiliary in making our class work of more vital interest. Through the energy of Dr. Brown, thirty different exhibits, illustrative of raw materials and industrial processes, are now upon the shelves of our cases. Considerable illustrative material has also been secured in the form of pictures and lantern slides. Through the addition of this equipment, we are now in a position to add considerably to the value of our courses in Economics.

"The general reorganization of the work of the College, preparatory to entering upon the four-year high school entrance requirement, has necessitated many changes in our prospective work for next year. In making these changes, we have taken care to preserve the division of labor prescribed for the College and State University. With this in mind, the two senior courses described as 'Advanced Economics' have been dropped.

"To meet the demands of the various departments of the College, several new courses have been added for next year. All of these, however, are adaptations of the practical courses formerly given. The material, however, has been re-worked to better adapt it to the needs of the different schools of the College.

"In view of the growing interest in the marketing of Agricultural Products, Cost Accounting, and Farm Efficiency, I would suggest that the President call a conference of those interested, with a view to establishing a Farmers' Business Course, leading to the Bachelor's Degree. This course can very well be followed by graduate courses leading to higher degrees as the demand for such courses arises. In view of the possibility of organizing such a course, I would suggest that we begin immediately to look for a new man who has completed his work for a Doctor's Degree with Agricultural Economics as a specialty.

"There is another point which I desire to emphasize. It is the opportunity of obtaining cheap museum material at the Panama-Pacific Exposition next summer. This is a chance in a lifetime. It appears to me that the State and College should cooperate in obtaining such material as might be desirable for educational purposes. I have included no special

item for this purpose in my estimate of expenses, but recommend it to the earnest consideration of all who are interested in building up the illustrative side of our technical educational equipment."

Political Science. Extracts from Doctor Dubach's Report: "The growth of the department is evident. Two hundred students were enrolled each semester; and estimates indicate that three hundred will be enrolled each semester next year. The majority of the departments of the College require National, State, and Municipal Government. This necessitates offering the course in five sections next year. Advanced Commercial Law will be offered in two sections to satisfy the increased demand for the course.

"During the school year 1913-14, the department has been given the full time of a professor for the first time. The head of the department has been assisted by Professor Horner and Mr. Lemon, the former teaching one class one semester, and the latter one class one semester and two classes the other.

"The department desires to add to the present program two elective courses, each three hours for one semester, making one year's work.

"I. Advanced American Government: This course will supplement our present courses in National Government and State and Municipal Government, giving chief attention to the interpretation of our Federal and State constitutions, and the relation of legislation to these constitutions. Court reports will be used liberally with a view to showing the interpretation of the rights of the people guaranteed in our constitutions and the powers granted to the government by these instruments.

"II. Practical Legislation. The work in Advanced American Government would serve as a preparation for this course which will instruct in practical bill drafting. Attention will be given to the correct form, and the correct expressions of the desired content of bills. Emphasis will be placed on the necessity of preparing laws with reference to prior legislation and court decisions. In addition, it is hoped that students will be led to see the necessity of studying conditions, and the possibility of guiding legislation to meet the demands of the times.

"The department regards these courses as absolutely essential to the completion of our program. We are sending students into all walks of life, and counseling them to take an active part in the affairs of State. These people will be called upon to aid in securing legislation along industrial lines. Today the large majority of legislation has an economic bearing, and as never before, agricultural and commercial classes are demanding representation in our legislatures. If these classes that we are sending from this school are to assume their part in such work, they need the advantages of the information of these courses.

"Due to the large number of students and classes, the department has been unable to give much attention to work outside of school. Professor Dubach attended the meeting of the Pacific Coast Branch of the American Political Science Association at Seattle and delivered an address.

He also offered a course on the 'Opportunities of Rural Life' at the Y. M. C. A. conference at Columbia Beach, June 12 to 21.

"The work for next year will continue in the same fields and by the same methods; but, with added assistance, it will be more intensive. Whenever possible, without neglect to immediate school duties, more attention will be given to outside work in the future. Better acquaintance with the State and the people is essential to the best service. Plans are being arranged to give some of our students opportunity to visit the legislature during its next session for first-hand study.

Stenography and Office Training. Extracts from Professor Blanchard's report: "The department of Stenography and Office Training has two purposes in mind; first, to devote its best energies to train students for the positions of stenographer, private secretary, verbatim reporter, and teacher of commercial subjects; second, to be of as much service as practicable to students of all other schools and departments of the College in giving them a general knowledge of efficient office procedure. Earnest endeavor is made to keep before the student the practical side of the courses offered, and to interest him in those organizations that aim to strive for more efficient training in his profession.

"In order to train those of our students who wish to enter the teaching profession, we should be in closer touch with the commercial departments of State high schools. A systematic investigation of these commercial departments should be undertaken, and lectures should be scheduled for high school convocation exercises concerning general commercial education, with special emphasis on the services offered by the School of Commerce here."

ROOM, EQUIPMENT, AND SUPPLIES.

Additional Room. The School of Commerce has for some time ranked second among the departments of the College in respect to the number of students taught annually, and under the new courses it will perhaps rank first in this respect. Its regular enrollment averages one-tenth of the total registration of the College. If the School continues to grow as it has in the last five years, larger quarters will be imperative. At present all the activities of the School are crowded into seven classrooms and two offices. At least three new rooms, and an office for the department of Political Science, will be needed next year.

Equipment. Few schools of commerce are better equipped than ours for effective Business Training. Hence additional equipment required is not extensive. The principal items needed are 33 student desks, to accommodate the students in Farm and Industrial Accounting. At present, we have no locker facilities for these students, and this causes great confusion and considerable loss to the students in material and time. These desks, however, will give drawer room for 165 students, nearly enough to accommodate all who will register in these courses next year. Full office equipment will be needed for the Bureau of Markets. I recom-

mend that we purchase another Edison Dictaphone and an Edison Mimeograph, both of which are essential to proper training in office methods. The growth of the work in typewriting will necessitate either the purchase or the rental of four new machines and desks. Of these two alternatives, I recommend purchase, since the rentals will pay for the machines in three years.

Repairs and Improvements. Under repairs there are needed certain partitions in Room 303 for the purpose of making more efficient the work in Stenography and Office Training. These partitions will be movable, and will in no way interfere with the use of the room for other purposes. There should be several changes in our lighting system, both in the interest of efficiency and economy.

Traveling Expenses. Heretofore, the School of Commerce has never been represented at any of the national conventions of commercial teachers, and no regular appropriation has been made for traveling expenses incurred by instructors who accompany students on inspection trips. Provision should be made for such purposes. There should also be an allowance for occasional lecturers who come to address the students of the School of Commerce.

Supplies. As hitherto, the student fees will be sufficient to meet the cost of class supplies. About \$125 a year will be required for office and class room supplies including postage.

The extraordinary importance attached to business training of farmers and all industrial classes appears from the fact that in the Office of Markets and Organizations of the U. S. department of Agriculture, the Division of Marketing Business Practice devotes its entire attention to the establishment of uniform cost accounting, auditing, and office systems for cooperative organizations. There is a similar organization in the Office of Farm Management for the study of uniform farm accounting and business systems. With these facts in mind, we may go ahead with the assurance that we are leading in a great forward movement for the solution of some of the great practical economic problems of our times.

Respectfully submitted,

J. A. BEXELL,
Dean of the School of Commerce.

REPORT OF THE DEPARTMENT OF PHARMACY.

To the President of the College,

Sir: I have the honor to submit to you the report of the department of Pharmacy. I am including certain recommendations in this report which I believe are necessary to the further development of the department.

Since I did not assume the duties of the head of the department of Pharmacy until September 1, 1914, and am therefore unable to give first-hand statistics of the work for the last biennium, I am confining this report to my observations in the department since joining the institution.

RESOURCES AND WORK OF THE DEPARTMENT.

I am pleased to report that I found the department well located on the fourth floor of Science Hall, with ample room to carry on the work for the number of students at present enrolled. In order to make the work more scientifically exact, however, it will be necessary to provide more light; this can only be done by building skylights.

The laboratory desks, although of a very inexpensive type, were well planned, and if provided with the necessary locks would be well fitted to carry on the work.

The stock room, on account of the poor grade of unplanned lumber used as shelving, is in need of remodeling.

The stock, I regret to say, I found in very poor condition, this being due, no doubt, to the breakage and loss incurred when the department of Pharmacy was transferred from the old quarters to the new. During the past few months, however, we have been very fortunate in having our stock replenished, and in a short time we shall be as well equipped for instructional work as the best schools of pharmacy.

Instruction. As we were unable to secure the services of a competent assistant in the teaching work of the department for this year, it became necessary to change the hours of classes so that I could teach all of the subjects in the curriculum but Pharmacognosy. For instruction in this subject, we were very fortunate, through the cooperation of the department of Chemistry, in securing the valuable services of Mr. M. J. Seeley, whose exceptional preparations for teaching this course relieved me of the responsibility of carrying it. The work, since the beginning of the year, has been progressing very satisfactorily.

Courses of Study. Several new courses have been added to the curriculum; these were needed in order better to fit the students for the

work they have undertaken. A revision of the courses in Pharmacy is now possible, since ample room and laboratory facilities permit a considerable expansion of the work. An effort will be made to arrange the courses of study so that they will compare favorably with those given at the best schools of Pharmacy. By doing this, it will be possible to exchange credits with the best schools.

In regard to the attendance of the department, it appears that the usual number of students are registered; and it is gratifying to me to note that the majority are registered in the longer course of study. This is the most satisfactory course in the department; and the students, from the standpoint both of scholarship and individual resources, are well prepared to carry on the work. The shorter course in Pharmacy has been arranged primarily for students who are older and who have had considerable experience in drugstore work. Under these conditions, they are able to carry the heavy work in this short course in a satisfactory manner.

NEEDS OF THE DEPARTMENT.

Fire Escapes. I desire to call attention to the need of fire escapes at Science Hall, especially from the fourth floor. Owing to the arrangement of the stairs and stock rooms, it would be almost impossible, should a fire occur, for the students to leave the building by the one exit that is available as the building is now constructed.

Apparatus. On my arrival I noticed the lack of pharmaceutical apparatus which is needed to carry on such analytical work as should be done by a State School of Pharmacy for the residents of the State. It often becomes necessary to investigate samples of unknown remedies for their identity, fitness for use, especially for young children, and for various other reasons. A laboratory of this kind would not only be of great value to the people of the State, but would improve the work of the department.

Drug Garden. The cultivation of drugs has become so universal of late that many drug farms are being started in the most favorable sections of the United States. Nearly all drugs, but more especially those which command high prices, are indigenous to Oregon. Before the cultivation of drugs in this State can be carried on with profit, however, it will be necessary to arrange experimental plots where the proper conditions of cultivation can be studied. A drug garden of this character could be maintained to good advantage at this College because of the facilities for general botanical work.

Instructor. It will be necessary to secure an assistant in Pharmacy for the ensuing year. It is impossible for one instructor to teach all of the subjects with sustained efficiency. I therefore recommend that such an assistant be engaged.

Museum and Illustrative Apparatus. It is customary in all lines of instructional work, but more especially in Pharmacy, to have a museum

where special pieces of apparatus, the various types of newer remedies, and entire drug plants can be exhibited. By having available exhibits to which he can refer, the student often gains ideas that would be difficult for him to grasp from mere explanation.

It is impossible to carry in stock all types of drug plants, because many of them are so large that it would be impossible to show them. By use of a projection lantern and a set of slides, however, it is possible to show the characteristics of all drug plants; and this in itself is a most desirable feature of any school of pharmacy.

Respectfully submitted,

ADOLPH ZIEFLE,

Professor of Pharmacy.

REPORT OF THE LIBRARIAN.

To the President of the College,

Sir: I have the honor to submit the following report of the Library for the biennium ending June 30, 1914:

Size of the Library. The library consists of 28,300 volumes, including government documents, together with about 40,000 pamphlets. It subscribes for 422 periodicals and receives about 175 gratis. It has received as gifts 384 volumes, 29 of which were received from the University of Oregon library. These were duplicates of books in the University library, but not included in the College library. The remainder of the gifts were chiefly from the faculty and alumni of the College.

During the past biennium the library again received a State appropriation of \$15,000 for books and periodicals. From the Crop Pest appropriation, books and periodicals to the amount of \$805.47 have been purchased.

Library Staff. The library staff has consisted of the librarian and four assistants, together with a page working not more than three hours a day.

Service. The regular service consists in the circulation of books, and in reference work for the students and faculty. Until a few months ago the library hours were 8:00 a. m. to 6:00 p. m., with a closed hour for lunch, and from 7:00 to 9:00 p. m. four evenings in the week; however, the demand for service became so great that the open hours have been lengthened by seven a week, making a total of 61 hours a week during the regular school year and 48 hours during the summer.

Growth of the Library. A brief comparison with the report of the preceding biennium shows a most gratifying growth in the usefulness of the library. On June 30, 1912, the library contained 11,405 cataloged volumes; on June 30, 1914, it contained 21,245 volumes, showing an addition for the biennium of 9,840 volumes, an increase of over 96 per cent. With the exception of perhaps 500 volumes of valuable sets of government documents which we have been able to complete during the biennium, the addition is new material.

On June 30, 1912, the library subscribed for 268 periodicals; the subscription at present numbers 422 periodicals, an increase of 75 per cent. The periodicals added are scientific and technical, very few general periodicals having been added.

The circulation of books and periodicals among faculty and students has increased during this biennium 70 per cent over that of the preceding biennium, and it is safe to assume that the reference work has kept pace with the circulation. It would have been impossible, with the present library staff, to care for this increased work, if our students were not taught by practical laboratory problems the use of the library and how

to serve themselves. A one-credit course is given all freshmen in the use of reference books, catalogues, indexes, and bibliographies of both books and periodicals.

One feature of the service added during the past biennium has proved very satisfactory; lists of the new books added to the library from time to time, have been sent to the faculty and employees of the College. This has been an important factor in increasing the circulation of books among the faculty.

During the Winter Short Course, lectures were given to the Short Course students on library material helpful to farmers and how it may be secured. There has been a continued demand from different parts of the State, especially from the alumni, for library help and material. The library has been called upon recently for some extension work. Assistance was asked and given in the organization of the Corvallis Public Library, and the librarian was asked to address the Southern State Federation of Women's Clubs on the subject of libraries and children's books.

The work next year will be greatly strengthened through better department organization, made possible by the addition of another trained library assistant; it will be strengthened, also, by the high educational and technical qualification of our library staff for next year. Every member except the stenographer and page will be a college graduate, and of these all except one have had from five to six years university training, and two years special training in university library schools. This educational and technical training gives our staff the efficiency so necessary in a college library, where service must be exact and prompt.

Needs. It is unnecessary to state our need of a library fund at least as great as that of the last biennium. It should be considerably increased. Although our library has grown at a most gratifying rate, it is still far from adequate to meet the needs of a school growing in numbers and quality of work as is our College.

Our greatest need is room in which to house our excellent, rapidly accumulating collection, and to carry on the necessary library operations. Our student body in 1908-09 numbered 1,351, in 1913-14, 2,435; thus, while our student body has nearly doubled, and our number of books and periodicals has increased in proportion, we have not been able to increase our reading room space at all. There were frequent occasions last winter when the seats were all taken, when students were standing about the room, and other students leaving because of the discomforts of such a crowded place.

The statement concerning the additions to our library given above show that while we have nearly doubled the amount of material in the library during the last biennium we have not increased our shelving capacity. It would have been physically impossible as well as unsafe to house this material if we had not secured some relief by piling our least-used government documents on the floor in one of the offices on a lower floor. It is unnecessary to state that the efficiency and economy of

service is greatly impaired from the crowded condition which makes it impossible to keep the library material shelved in logical order. Great credit is due our library assistants for the faithful cheerfulness with which they have served under the existing crowded conditions through this stressful period of growth. It speaks well for their self-control and loyalty.

From the point of view of both service and storage, relief in the matter of housing the library has become imperative.

Respectfully submitted,

IDA A. KIDDER,

Librarian.

REPORT OF THE REGISTRAR.

To the President of the College,

Sir: I have the honor to submit, herewith, my report as Registrar of the College. The report covers the two academic years 1912-13, 1913-14. You will note that figures showing the total number of matriculates do not include students enrolled in correspondence work, but only those taking resident work at the College. In addition to the totals listed below, about fifty persons took advantage of the free correspondence course offered by the School of Commerce. These comprised farmers, semi-professional men, merchants, and clerks, men whose ages ranged from nineteen to forty-seven years.

In comparing the enrollment for the biennial period by schools and departments, we notice a substantial increase in the total number of students for the degree courses of Agriculture, Domestic Science and Art, Commerce, and Pharmacy.

Table I. Comparative Statement Showing Classification as to Courses.
(All duplicates excluded.)

Departments	36 Weeks courses		Winter courses		Total	
	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Agriculture	429	496	621	521	1050	1017
Forestry	51	81	3	*	54	81
Domestic Science and Art.....	270	326	201	126	471	452
Engineering and Industrial Arts.....	299	302	12	3	311	305
Pharmacy	51	69	*	*	51	69
Commerce	143	160	15	19	158	179
Optional	59	86	*	*	59	86
Music Only	62	59	*	*	62	59
Summer School					98	187
Totals	1364	1579	852	669	2314	2435

*No courses offered.

With the ratio of men to women in the student body remaining practically constant during the biennium, (70 per cent men and 30 per cent women), there is a steady, though in the aggregate not rapid, increase in the number of women registering in the technical courses, other than Domestic Science and Art. Such departments, showing an increase in the number of women registered, are Agriculture, Commerce, and Pharmacy. The percentage of increase of women registering in these departments is thirteen per cent, while the increase in the Domestic Science department for the same period was approximately twenty-one per cent.

Table II. Matriculates Classified as to Sex and Departments.

Departments	1912-13			1913-14		
	Men	Women	Total	Men	Women	Total
Agriculture	424	5	429	490	6	496
Forestry	51	.....	51	81	.....	81
Domestic Science and Art .....	.....	270	270	.....	326	326
Engineering and Industrial Arts.....	299	.....	299	302	.....	302
Commerce	101	42	143	113	47	160
Pharmacy	44	7	51	61	8	69
Optional	14	45	59	20	66	86
Summer School	20	78	98	69	118	187
Music	15	47	62	19	40	59
Winter Short Course.....	645	207	852	494	175	669
Totals	1613	701	2314	1649	786	2435

Table III. Distribution of Students by Collegiate Rank or Year.

Classification	1912-13	1913-14
Graduates	27	18
Seniors	107	172
Juniors	176	227
Sophomores	215	267
Freshmen	476	532
Optional	59	86
Special	65	78
Secondary	177	140
Music	62	59
Winter Short Courses	852	669
Summer Session	98	187
Totals.....	2314	2435

Table IV indicates a notable advance in the average age of secondary students entering in 1913-14 as compared with those entering in 1912-13. This age, 19 years, is nearly a year in advance of the average age of students graduating from State high schools.

Table IV. Average Age of Regular Students.

	1912-13	1913-14
Secondary students	18.2	19
College students (including special and optional).....	19.7	20.1
Senior class	22.5	22.4

A number of interesting facts appear from the study of Table V showing the geographical distribution of students. First of all is the fact that for each of the two years of the biennium, every county in the State was represented at the College by three or more students in residence. For each of the two years, two counties, Multnomah and Benton, sent more than two hundred students each, and in 1912-13 Linn sent one hundred seven, with ninety-nine for the following year. The second year of the biennium is representative of the general distribution of students throughout the State; and for that period nine counties sent fifty or more students, ten others sent not less than twenty each, and only eight counties of the State were represented by less than ten students, with three as a minimum, the latter coming from a county with only one and one-fourth persons to the square mile.

Each year of the biennium shows representatives registered at the College from states which form an unbroken chain from the Atlantic to

the Pacific, and, in addition to these states, twelve foreign countries were represented by matriculates. Totals of Table V indicate that for the year 1912-13, approximately one student in seven registered from some state other than Oregon, while in 1913-14 the ratio was approximately one in six. Details of the geographical distribution are as follows:

Table V. Distribution of Students by Residence.

(All duplicated excluded.)

Oregon counties	36 Weeks courses		Short courses		Total	
	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Baker	8	17	1	5	9	22
Benton	264	306	466	387	730	693
Clackamas	33	39	19	16	52	55
Clatsop	31	25	13	2	44	27
Columbia	7	12	3	6	10	18
Coos	17	20	8	4	25	24
Crook	12	11	6	5	18	16
Curry	4	2	6	3	10	5
Douglas	27	34	16	22	43	56
Gilliam	6	6	2	1	8	7
Grant	1	2	2	1	3	3
Harney	11	7	3	2	14	9
Hood River	21	29	34	26	55	55
Jackson	32	28	14	13	46	41
Josephine	13	14	3	8	16	22
Klamath	5	9	4	5	9	14
Lake	7	6	4	3	11	9
Lane	42	40	10	34	52	74
Lincoln	19	6	11	11	30	17
Linn	50	50	57	49	107	99
Malheur	5	8	1	...	6	8
Marion	62	59	28	37	90	96
Morrow	4	9	...	3	4	12
Multnomah	214	253	54	52	268	305
Polk	25	29	25	18	50	47
Sherman	11	13	1	4	12	17
Tillamook	3	5	...	3	3	8
Umatilla	31	34	7	12	38	46
Union	27	36	6	2	33	38
Wallowa	20	16	1	3	21	19
Wasco	13	20	7	6	20	26
Washington	27	26	25	23	52	49
Wheeler	3	7	1	...	4	7
Yamhill	36	49	29	25	65	74
Totals	1091	1227	867	791	1958	2018

Foreign countries	36 Weeks courses		Short courses		Total	
	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Armenia	1	...	...	...	1	...
Canada	8	10	8	7	16	17
China	5	3	...	...	5	3
Hawaii	4	6	1	...	5	6
Greece .....	...	1	...	...	...	1
India	6	6	...	...	6	6
Ireland	1	...	1	...	2	...
Japan	5	4	...	...	5	4
Mexico	2	...	1	...	3	...
Philippine Is.	1	1
Poland	1	1	...
Russia	1	2	1	2
Totals	34	33	11	7	45	40

REPORT OF THE REGISTRAR

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DISTRIBUTION BY RESIDENCE—Continued

States and territories	36 Weeks courses		Short courses		Total	
	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
Alabama	1				1	
Alaska	3	6	2	1	5	7
Arizona	1		1		2	
California	70	102	11	9	81	111
Colorado	1	2	1		2	
Connecticut	1			1	1	
Delaware	3	1			3	1
Dist. of Columbia	1				1	
Florida		1				1
Idaho	22	29	5	3	27	32
Illinois	5	14	4	4	9	18
Indiana	2	6		1	2	7
Iowa	3	3	1	1	4	4
Kansas	2	8			2	8
Kentucky	3	3			3	3
Louisiana	1				1	
Maine			1	1	1	1
Massachusetts	6	7			6	7
Michigan	2	4	1		3	4
Minnesota	3	5	1	2	4	7
Missouri	1	2		1	1	3
Montana	1	5	1		1	5
Nebraska	3	3			3	3
New Hampshire	1	1			1	1
New Jersey	3	1			3	1
New Mexico	2	1			2	1
New York	10	12	6	1	16	13
North Carolina	1				1	
North Dakota	1			1	1	1
Ohio	3	6			3	6
Oklahoma	6	2			6	2
Pennsylvania	2	3		1	2	4
Rhode Island		1				1
South Dakota	2	1		1	2	2
Texas		1	2		2	1
Utah	1	1			1	1
Vermont	1		1		2	
Washington	69	82	35	29	104	111
Wisconsin	1	3		1	1	4
Wyoming	1	2			1	2
	239	319	72	58	311	377
Oregon Counties	1091	1227	867	791	1958	2018
States and Territories	239	319	72	58	311	377
Foreign Countries	34	33	11	7	45	40
Grand Total	1364	1579	950	856	2314	2435

Table VI shows the scholarship qualifications of students at their entrance to College in 1913-14 as compared with 1912-13. It will be noted that there was a gain of practically 37 per cent in the number of intrants with the full four years of high school credit in 1913-14 as compared with 1912-13.

Table VI. Comparative Statement of the Educational Standing of Intrants Before Registering at the College.

	1912-13		1913-14	
	No. of Intrants	Percent of Intrants	No. of Intrants	Percent of Intrants
Entered on examination	3	.48	2	.30
Eighth grade graduates	104	16.67	67	10.00
Ninth grade graduates	58	9.30	43	6.41
Tenth grade graduates	123	19.71	116	17.30
Eleventh grade graduates	51	8.01	66	9.85
Twelfth grade graduates	221	35.41	303	45.22
Transfers from Colleges and Universities	64	10.26	73	10.90
	624		670	

During the biennium 1912-14 the College offered baccalaureate degrees in nine different schools and departments; namely, Agriculture, Forestry, Domestic Science and Art, Civil Engineering, Electrical Engineering, Mechanical Engineering, Mining Engineering, Commerce, and Pharmacy. The tenth department, that of Industrial Arts, was added to the degree courses for the first time in 1913-14. Within the nine schools and departments, major courses were offered in twenty-one distinct lines of work. During the past few years there has been a steadily growing demand for graduate work, not only from our own alumni, but from students coming from other institutions with the degree of bachelor of science. The steady growth of the graduating class during recent years is shown by the fact that the class of June, 1914, was two hundred and sixty per cent larger than the last class graduating prior to the present administration, (that is, the class of June, 1907).

Table VII. Degrees Conferred and Certificates Granted.

	1912-13			1913-14		
	Men	Women	Total	Men	Women	Total
Master of Science in						
Agriculture	2		2	3		3
Bachelor of Science in						
Agriculture	35		35	55	2	57
Forestry	2		2	6		6
Domestic Science and Art.....		21	21		46	46
Engineering	24		24	35		35
Commerce	9	3	12	10	2	12
Pharmacy	3		3	2	2	4
Total Degrees.....	75	24	99	108	52	163
Certificate in						
Two-Year Pharmacy Course.....		2	2	3		3
Diploma in						
Music		3	3		6	6
Grand Totals	75	29	104	114	58	172

Table VIII. Colleges, Universities, and Normal Schools from Which Members of the Graduating Classes for the Past Two Years Transferred to the Oregon Agricultural College.

UNIVERSITIES AND COLLEGES	1913	1914
University of Minnesota	2	..
University of Maine	1	..
University of Wisconsin	1	..
University of Oregon	3	1
University of Missouri	2	..
University of California	1	3
University of New Mexico .....	..	1
University of Puget Sound (Washington*).....	..	1
University of Idaho .....	..	1
University of Illinois .....	..	2
University of Washington .....	..	1
University of No. Dakota .....	..	1
University of Kansas .....	..	1
Ohio State University	1	..
Stanford University	1	..
Cornell University (N. Y.) .....	..	2
Willamette University .....	..	2
Wesleyan University (Ohio) .....	..	1
Iowa State Agricultural College	3	1
Michigan Agricultural College	2	..
Washington State College	3	3

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Kansas Agricultural College	2	1
Oklahoma Agricultural College	2	..
Occidental College (California)	1	3
Wittenberg College (Ohio) .....	..	1
Oberlin College (Ohio) .....	..	1
Iowa Wesleyan .....	..	1
California Polytechnic .....	..	1
Grenville College (Illinois)	1	..
Connecticut Agricultural College .....	..	1
Howard Payne College (Mo.) .....	..	1
Albany College .....	..	1
Berea College (Ky.) .....	..	1
Hiram College (Ohio) .....	..	1
Dallas College .....	..	1
Colorado School of Mines .....	..	1
College of Ind. Arts (Texas) .....	..	1
Highland Park College (Iowa) .....	..	1
Ontario Agricultural College .....	..	1
Kurnamoto Agricultural School (Japan)	1 27	39

NORMAL SCHOOLS

Bellingham Normal (Washington)	1	..
California State Normal .....	..	1
Eastern Oregon State Normal .....	..	1
Oregon State Normal	3 4	2
	31	41

Table IX. Graduates, 1913.

AGRICULTURE

Roy Alsbaugh, Estacada, Clackamas
 Leo Bernstein, Portland, Multnomah
 Ralph Abel Blanchard, Chicago, Illinois
 Charles Stockton Brewster, Minneapolis, Minnesota
 Homer Maxwell Carnes, North Powder, Union
 Earl Charles Chandler, Sheridan, Yamhill
 Arthus Chase, Corvallis, Benton
 Benjamin Harrison Cooper, Corvallis, Benton
 John E. Cooter, Cottage Grove, Lane
 Ernest Walton Curtis, Claremont, California
 William Henry Dunham, Portland, Multnomah
 Jesse Boyd Edington, Athena, Umatilla
 Blaine Ferguson, Hailey, Idaho
 Jesse Ray Fleming, Shaniko, Wasco
 James Clarence Gibbs, Grace, Idaho
 Harold Roland Glaisyer, Forest Grove, Washington
 Frank Harrington, Creswell, Lane
 Leonard Ramsden Hartill, Brooklyn, New York
 Harry Clayton Hetzel, Madison, Wisconsin
 D. Brooks Hogan, Lebanon, Linn
 Donald Kellogg, Hoquiam, Washington State
 Glenn Kelly, Portland, Multnomah
 Lawrence McBride, Eddyville, Lincoln
 Cecil Paul Moffitt, Junction City, Lane
 G. Millage Montgomery, Alhambra, California
 Kakuji Okamoto, Kumamoto-Ken, Japan
 Earl Nathaniel Percy, Portland, Multnomah
 Louis Sawyer, Salem, Marion
 Obil Shattuck, Klamath Falls, Klamath
 Frederick Lawrence Strang, Medford, Jackson
 Royal Burleigh Thompson, Corvallis, Benton
 Gordon Keller VanGundia, Sycamore, Ohio
 Edward Jasper Weber, Creswell, Lane
 James Harold Wilson, Gresham, Multnomah
 Myron McCord Winslow, Okmulgee, Oklahoma

FORESTRY

Walt LeRoy Dutton, Lakeview, Lake
 Harold Sale Turley, Astoria, Clatsop

DOMESTIC SCIENCE AND ART

Elizabeth May Buchanan, Corvallis, Benton
 Alice Marie Cathey, Corvallis, Benton
 Helen Julia Cowgill, Corvallis, Benton
 Lucy Adella Crawford, Ashland, Jackson
 Mrs. Annie Cusick, Medford, Jackson
 Adella Davenport, Corvallis, Benton
 R. June Gray, Eugene, Lane
 Mary Elizabeth Hartung, Eugene, Lane
 Clara Hartzog, Lakeview, Lake
 Grace Hobbs, Eugene, Lane

Annie Marie Johnson, Albany, Linn
 Dorothy Keatley, Castle Rock, Washington State
 Emily Marie Miller, Corvallis, Benton
 Margaret Chadsey Morehouse, Eugene, Lane
 Margaret Mead Osburn, Newport, Lincoln
 Delia Jeanetta Purves, Seattle, Washington State
 Amber Bessie Spaulding, Albany, Linn
 Dorathea Steusloff, Salem, Marion
 Emma Matilda Ueland, Roseburg, Douglas
 Henrietta Walker, Cleveland, Douglas
 Opal Wasser, Corvallis, Benton

CIVIL ENGINEERING

Charles McFerrin Hartsock, Albany, Linn
 G. Clay Jones, Corvallis, Benton
 Benjamin Henry McNamee, Portland, Multnomah
 Eugene Herman Scovil, Grants Pass, Josephine
 Francis Willard Smith, Portland, Multnomah
 Harry Mark Teel, Echo, Umatilla
 William Henry Whiteley, Corvallis, Benton

ELECTRICAL ENGINEERING

Roy Julius Anderson, Tillamook, Tillamook
 Leeser Solis Cohen, Portland, Multnomah
 Guy Cronemiller, Lakeview, Lake
 Yoshitaro Fujihira, Wakayama, Japan
 Leonard Humphrey Kistler, Portland, Multnomah
 Robert McKenzie, Lostine, Wallowa
 George R. Milner, Okmulgee, Oklahoma
 George Willis Morris, Corvallis, Benton
 Lance Read, Portland, Multnomah
 Homer Harrison Shake, Payette, Idaho
 Odith Spurrier, Guthrie, Oklahoma
 Lester Tyce, Brownsville, Linn

MECHANICAL ENGINEERING

Frederick Carl Jernstedt, Carlton, Yamhill
 Leo Edwin Johnson, Carlton, Yamhill

MINING ENGINEERING

Carl Nathaniel Anderson, Portland, Multnomah
 Rowley Cruik, Liverpool, England
 S. Whitley Richardson, Salem, Marion

COMMERCE

R. Walton Brown, Drewsey, Harney
 Malich Earl Canfield, Albany, Linn
 Frank Azem Keefover, Salem, Marion
 LeRoy Roderick McKenzie, Summerville, Union
 Virginia Rhomeyn Mescher, Silverton, Marion
 Erwin Montague, Arlington, Gilliam
 Edgar Turner Pierce, Harrisburg, Linn
 Lester Porter, Corvallis, Benton
 Grace Eugene Wallace, Independence, Polk
 Gertrude LaVern Walling, Salem, Marion
 Arthur James Wilson, Albany, Linn
 Willis Webster Winslow, Okmulgee, Oklahoma

PHARMACY

Thomas Hawkins, Toledo, Lincoln
 Desire Joseph Perard, Toppenish, Washington State
 Charles Henry Reynolds, La Grande, Union

MASTER OF SCIENCE IN AGRICULTURE

Godfrey Vernon Copson, Grand Rapids, Michigan
 Harley Frost Wilson, Corvallis, Benton

DIPLOMA SCHOOL OF MUSIC

Florence Irene Boco, Corvallis, Benton
 Sylvia Alice Oakes, Gaston, Washington
 Maud Josephine Turlay, Astoria, Clatsop

CERTIFICATE PHARMACY SHORT COURSE

Vida Chrisman, Silver Lake, Lake
 Opal Viola Daley, Medford, Jackson

Table X. Graduates, 1914.

AGRICULTURE

Leonard John Allen, Cove, Union
 Louis Frederic Anderson, Pendleton, Umatilla
 Ralph Waldo Arens, Hood River, Hood River
 James Charles Bonner, Corvallis, Benton
 Joe Miles Boothe, Union, Union
 Mortimer Parker Cook, Portland, Multnomah
 Sumner John Damon, Ferndale, California
 Connor Whealdon Edwards, Monroe, Benton
 Kate Whittlesey Failing, Portland, Multnomah
 Harold Darwin Foster, Seattle, Washington State
 Hosmer Cullen Gambee, Portland, Multnomah
 Louis Phaon Gambee, Portland, Multnomah
 Joseph Hunter Gooding, Wilmington, Delaware
 Charles Lester Hill, Berea, Kentucky
 Melvin Rutherford Hoff, New Era, Clackamas
 Walter Leo Horobin, Cornwall-on-Hudson, New York
 D. C. Howard, Corvallis, Benton
 Walter William Howard, Corvallis, Benton
 Jesse Brooke Hukill, Corvallis, Benton
 Neal Clement Jamison, Corvallis, Benton
 George Raymond Johnson, Cooston, Coos
 Frank Walter Kehrli, Hillsdale, Multnomah
 Oliver Frank Kilham, Beverly, Massachusetts
 William King, Eugene, Lane
 Andrew Cameron McCormick, Lebanon, Linn
 John Robert Magness, Amity, Yamhill
 John Holmes Martin, Corvallis, Benton
 Albert Freeman Mason, Pasadena, California
 John Frederick Morse, San Francisco, California
 George Franklin Moznette, Vancouver, Washington State
 Kay Albert Needham, Tracy, California
 Francis Edwards Neer, Pasadena, California
 Raymond Edward Nicholson, Hood River, Hood River
 Clara Manerva Nixon, Trumansburg, New York
 Aaron Lemuel Olmsted, Enterprise, Wallowa
 Henry Irving Padgham, Santa Ana, California
 Emmet Nathan Palmer, Central Point, Jackson
 Charles Leon Robinson, Forest Grove, Washington
 Ralph Merrill Rutledge, Corvallis, Benton
 George Friedrich Sanders, The Dalles, Wasco
 Henry Isaacs Savage, Corvallis, Benton
 Harry August Schoth, Oregon City, Clackamas
 Fred William Schreiber, McMinnville, Yamhill
 Carl Ephraim Schuster, Corvallis, Benton
 Joy William Scudder, Seattle, Washington State
 Robert Ervin Shinn, Salem, Marion
 Herbert William Siefert, Pasadena, California
 William Anderson Smart, Santa Ana, California
 Charles Allison Starker, Portland, Multnomah
 Oscar Brent Stauff, Cooston, Coos
 Victor Hugo Stauff, Cooston, Coos
 Hans Struve, Pendleton, Umatilla
 Leif Erikson Wahlberg, San Francisco, California
 Byron Bentley Walker, Nova Scotia
 Harry Sidney Walters, Cove, Union
 Estey Walton, Sanger, California
 Chester Manning Wilcox, Portland, Multnomah

FORESTRY

Lynn Foster Cronemiller, Lakeview, Lake
 Lee Earl Emery, Corvallis, Benton
 James Camston Evenden, Warrenton, Clatsop
 Paul Freydidg, Sutherlin, Douglas
 Marshall Crane Hayes, Pasadena, California
 Carl Nelson Miller, Indianapolis, Indiana

DOMESTIC SCIENCE AND ART

Etta Adamas, Corvallis, Benton
 Edith May Allworth, Crawford, Washington State
 Leona Crawford Atherton, Heppner, Morrow
 Viva Delle Archibald, Albany, Linn
 Ursula Amelia Becke, Aurora, Marion
 Norma Gladys Bick, Philomath, Benton
 Bertha Mildred Booth, Portland, Multnomah
 Elva Merle Bowen, Silverton, Marion
 Edythe Matilda Brunquist, Hood River, Hood River
 Alice Emma Butler, Mapleton, Iowa
 Jennie Emma Cadwell, Berkeley, California

Anabelle Trustlo Callison, Aberdeen, Washington State
 Hazel Cartan, Corvallis, Benton
 Maribel Whitman Cheney, Coupeville, Washington State
 Grace May Dinges, Corvallis, Benton
 Cordelia Hawley Goffe, Medford, Jackson
 Jettie Marie Hanson, Corvallis, Benton
 Esther Jennie Hartung, Eugene, Lane
 Marie Anette Hofer, Salem, Marion
 Hazel Holt, Corvallis, Benton
 Virginia Keatley, Castle Rock, Washington State
 Anna Marian Keller, Portland, Multnomah
 Kathreen Lea Kirkpatrick, Pendleton, Umatilla
 Mayme Elizabeth Lance, Corvallis, Benton
 Elizabeth Thurman Lewis, Pacific Grove, California
 Hazel Adelia McKee, Lakeview, Lake
 Lottie Faye Mentzer, Pendleton, Umatilla
 Ethel May Metzler, Corvallis, Benton
 Lottie Milam, Macon, Missouri
 Helen Loraine Miller, Portland, Multnomah
 Christine Orford, DeLamar, Idaho
 Nola Payne, Woodburn, Marion
 Gladys Aileen Robey, Corvallis, Benton
 Chista Al Wilda Solomon, Salem, Marion
 Edyth Golda Shaw, Salem, Marion
 Winnie Catherine Shields, Milton, Umatilla
 Esther Ruby Smith, Corvallis, Benton
 Evelyn Dumaresq Spencer, Portland, Multnomah
 Mylius Lysle Summers, Fresno, California
 Georgia Lois Swafford, San Luis Obispo, California
 Lillian Thordarson, Corvallis, Benton
 Sarah Bledsoe Vineyard, Boise, Idaho
 Flora Whiteley, Victoria, British Columbia
 Lois Katherine Wilson, Salem, Marion
 Mildred Marie Wilson, Salem, Marion
 Marian Drusilla Young, Coquille, Coos

CIVIL ENGINEERING

Alan Kendall Andrews, Medford, Jackson
 Walter Burton Edward Anthony, Carmel, California
 Huron Willoughby Clough, Canyonville, Douglas
 Ben Eddy, Roseburg, Douglas
 Frank Fiedler, Bellingham, Washington State
 Benjamin Barton Irving, Corvallis, Benton
 Edward Benjamin Loken, Harrisburg, Linn
 William Tracy Moore, Oak Grove, Clackamas
 Henry Odeen, Portland, Multnomah
 Peter Melvin Rinearson, Milwaukee, Clackamas
 John Irving Roberts, Sandy, Clackamas
 Dexter Ralph Smith, St. Johns, Multnomah

ELECTRICAL ENGINEERING

John Walter Asplund, Marshfield, Coos
 Harold Sidney Babb, Campbell, California
 Vernon Granding Corkins, Enterprise, Wallowa
 Will Herman Foster, Corvallis, Benton
 Arnold Ernest Kuhnhausen, Portland, Multnomah
 Alfred Oscar Mangold, Portland, Multnomah
 Victor Eugene Weber, Brownsville, Linn

MECHANICAL ENGINEERING

Mylo Bartu, Crabtree, Linn
 Claud Carthel Baynard, Aumsville, Marion
 Ray Boals, Dallas, Polk
 Spencer Albert Covell, Corvallis, Benton
 Robert Ray Davis, Hillsboro, Washington
 Ray Roy Hamersley, Corvallis, Benton
 Earl Logan Harry, Corvallis, Benton
 Lester Thomas Hutt, Yamhill, Yamhill
 Fred Merle Miller, Albany, Linn
 Carl Emil Nieueger, Summerville, Union
 Virgil Arthur Rawson, The Dalles, Wasco
 Orvill Greenleaf Reeves, Pendleton, Umatilla
 Gilbert Thayer, Portland, Multnomah

MINING ENGINEERING

Charles Lloyd Chapman, Sheridan, Yamhill
 Ethelbert Dowden, Plainview, Texas
 Thomas Alfred Rice, Portland, Multnomah

COMMERCE

Chester Allen Dickey, Wallowa, Clackamas
Sylvan Durkheimer, Portland, Multnomah
Delmar Eddy, Kings Valley, Benton
Ruth Blanche Hawley, Corvallis, Benton
Emil Edwin Horning, Corvallis, Benton
Russel Marion Howard, Corvallis, Benton
Hattie Joy Mason, Hood River, Hood River
Thomas Everett May, Portland, Multnomah
James Emmett Norton, Airlie, Polk
Gordon Rasmussen, Marshfield, Coos
John Richard Williams, Portland, Multnomah
Milton Edwin Woodcock, Corvallis, Benton

PHARMACY

Gaylord Gerald Godfrey, Oregon City, Clackamas
Olive Marv Harry, Corvallis, Benton
Benjiman Horning, Otter Rocks, Lincoln
Rose Coffman Mason, Jefferson, Marion

MASTER OF SCIENCE IN AGRICULTURE

Alden Forrest Barss, Rochester, New York
Glancy Sherman Ralston, Paradise, California
Warren Porter Tufts, Berkeley, California

DIPLOMA SCHOOL OF MUSIC

Janet Ann Blackledge, Corvallis, Benton
Sophia Marie Holboke, Portland, Multnomah
Mary Palmer Morgan, Corvallis, Benton
Elma Opa Rogers, Corvallis, Benton
Ruth Luella Rondeau, Corvallis, Benton
Lena Belle Tartar, Corvallis, Benton

CERTIFICATE PHARMACY SHORT COURSE

Harold Helmuth Albers, Shoshone, Idaho
George Washington Davis, Silverton, Marion
Thomas Laird, Bandon, Coos

Respectfully submitted,

H. M. TENNANT,

Registrar.

REPORT OF THE TREASURER.

To the Honorable President and Board of Regents of the Oregon Agricultural College,

Gentlemen: Herewith my report covering all Federal, State, and County appropriations for Maintenance, Buildings, Equipment, Improvement, Repairs, Library, Experiment, Educational Extension, and other scientific and educational purposes.

Because of the limited time between December 31 and the session of the legislature, it is impracticable to bring all reports up to the close of the calendar year; hence I have shown all Maintenance and Special appropriations up to June 30, 1914; Experiment Stations and Educational Extension up to September 30, 1914, and County Extension appropriations up to December 10, 1914.

Respectfully submitted,

B. F. IRVINE,
Treasurer.

I—RESIDENT INSTRUCTION.

Table I.—Receipts and Disbursements.

	Fiscal year ending June 30, 1913.				
	Balance July 1, 1912	Receipts	Available	Disburse- ments	Balance June 30, 1913
RECEIPTS					
State Appropriation.....	\$ 4,830.29	\$175,000.00	\$179,830.29	\$170,557.64	\$9,272.65
Federal Appropriation					
Morrill		50,000.00	50,000.00	50,000.00	
Land-Grant Interest.....	1,624.69	12,649.49	14,254.18	14,254.18	
College Miscellaneous.....	26,408.74				
Fees		22,909.51			
Rents—Dormitories		3,000.00			
Sales, etc.....		5,574.56	57,892.81	54,312.26	3,580.55
Total	\$32,863.72	\$269,133.56	\$301,977.28	\$289,124.08	\$12,853.20
Available Receipts.....			\$301,977.28		
DISBURSEMENTS					
Salaries	\$174,309.33				
Labor	15,346.64				
Office Supplies.....	7,299.75				
Class Supplies.....	11,251.91				
Traveling Expense.....	2,787.83				
Heating	11,454.81				
Light and Power.....	3,151.19				
Water	1,004.17				
Telegraph and Tele- phone	933.96				
Publications and Print- ing	8,697.51				
Advertising	2,620.91				
Miscellaneous Supplies	3,663.60				
Lands	21,897.13				
Improvement	13,847.48				
Repairs	858.86				
Equipment	9,999.00				
Total disbursements.....			\$289,124.08		
Balance June 30, 1913.....					\$12,853.20

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Table II.—Receipts and Disbursements.

Fiscal year ending June 30, 1914.

RECEIPTS	July 1, 1913 Balance	Receipts	Available	Disburse- ments	Balance June 30, 1914
State Appropriation.....	\$ 9,272.65	\$300,000.00*	\$309,272.65	\$231,521.57	\$77,751.08
Land-Grant Interest.....		13,041.56	13,041.56	9,986.97	3,054.59
Morrill.....		50,000.00	50,000.00	50,000.00	
College Miscellaneous.....	3,580.55				
Fees		27,890.90	43,216.29	29,970.66	13,245.63
Rents		3,445.00			
Sales, etc.....		8,299.84			
Total	\$12,853.20	\$402,677.30	\$415,530.50	\$321,479.20	\$94,051.30
Available Receipts.....			\$415,530.50		
DISBURSEMENTS					
Salaries.....	\$210,123.52				
Labor.....	21,470.18				
Office Supplies.....	1,843.34				
Class Supplies.....	12,573.21				
Traveling Expense.....	4,185.23				
Heating.....	8,124.73				
Light and Power.....	3,182.29				
Water.....	1,107.73				
Telephone and Tele- graph.....	1,069.07				
Publications and Print- ing.....	9,139.28				
Advertising.....	3,409.20				
Miscellaneous.....	9,240.11				
Feeding Stuffs.....	2,915.29				
Freight and Express.....	1,666.53				
Buildings.....	7,345.04				
Land Purchased.....	3,581.00				
Rentals (Y.M.C.A.).....	400.00				
Improvement.....	13,368.42				
Repairs.....	122.16				
Equipment.....	826.66				
Live Stock.....	5,786.21				
Total Disbursements.....			\$321,479.20		
Balance June 30, 1914					
Maintenance.....	77,751.08				
L.-G. Interest.....	3,054.59				
College Misc.....	13,245.63			\$ 94,051.30	
Unpaid obligations esti- mated at				30,297.30	
Balance Available.....					\$63,754.00

*State appropriation for last half of 1913, \$100,000.00; 1914, \$200,000.00

Table III.—Special Appropriations, Receipts, and Disbursements.

From June 1, 1911, to June 30, 1914.

SPECIAL APPROPRIATIONS (1911)	Receipts	Expenditures	Balance June 30, 1913
BUILDINGS			\$ 7,427.46*
Horticulture	\$ 36,600.00	\$ 44,027.46	243.69
Armory	6,000.00	5,756.31	572.79
Dairy	29,700.00	29,127.21	36.68*
Farm Mechanics	14,600.00	14,636.68	1,101.20
Foundry	11,000.00	9,898.80	2,004.96
Stock Judging	7,600.00	5,595.04	3,541.50
Mining	28,000.00	24,458.50	
Total Buildings	\$133,500.00	\$133,500.00	
EQUIPMENT	60,000.00	60,000.00	
LIBRARY	15,000.00	15,000.00	
IMPROVEMENT AND RE- PAIRS	40,000.00	40,000.00	
LAND	25,000.00	25,000.00	
GRAND TOTAL	\$273,500.00	\$273,500.00	

Note.—1911 appropriations shown for the reason that unexpended balances were shown in the last report. *Deficit.

SPECIAL APPROPRIATIONS (1913)

	Receipts	Expenditures	Balance
NEW BUILDINGS			
New Gymnasium, Domestic Science and Art Building, Storage Building, and Stock Barn	\$107,000.00	\$106,580.10	\$ 419.90
IMPROVEMENTS AND REPAIRS, HEATING EXTENSION, and REMODELING			
SCIENCE HALL	67,000.00	66,981.66	18.34
EQUIPMENT	60,000.00	53,361.65	6,638.35
BOOKS, MAGAZINES AND PERIODICALS	15,000.00	5,657.10	9,342.90
TOTAL	\$249,000.00	\$232,580.51	\$16,419.49

II—AGRICULTURAL EXPERIMENT STATION.

Table IV.—Receipts and Disbursements.

For fiscal year ending June 30, 1913.

	Balance July 1, 1912	Receipts	Available	Disburse- ments	Balance June 30, 1914
Federal Appropriations					
HATCH		\$15,000.00	\$15,000.00	\$15,000.00	
ADAMS		15,000.00	15,000.00	15,000.00	
Miscellaneous					
SALES	\$50.24	9,557.71	9,607.95	9,607.83	\$.12
Total	\$50.24	\$39,557.71	\$39,607.95	\$39,607.83	\$.12
CLASSIFIED DISBURSEMENTS		Hatch	Adams	Miscellaneous	
Salaries		\$ 9,212.03	\$11,618.35	\$ 4,596.97	
Labor		3,019.82	791.34	1,008.44	
Publications		43.20		17.65	
Postage and Stationery		96.30	1.80	200.30	
Freight and Express		29.53	77.21	249.75	
Heat, Light, Water		37.65	104.87	8.00	
Chemical Supplies		187.99	762.22	43.81	
Seeds, Plants, Sundry Supplies		582.61	227.18	241.07	
Fertilizer		15.15			
Feeding Stuffs		1,196.00	80.65	2,230.39	
Tools, Machinery		229.70	22.85	110.10	
Furniture and Fixtures		5.72	53.50	2.00	
Scientific Apparatus		99.29	545.13	54.72	
Live Stock		52.75	3.40	274.90	
Traveling Expense			261.50	57.10	
Buildings and Land		192.26	450.00	63.10	
Contingent Expense				449.53	
Total Disbursements		\$15,000.00	\$15,000.00	\$ 9,607.83	
Balance June 30, 1913					.12

Table V.—Receipts and Disbursements.

For fiscal year ending June 30, 1914.

	Balance July 1, 1912	Receipts	Available	Disburse- ments	Balance June 30, 1914
Federal Appropriations					
HATCH		\$15,000.00	\$15,000.00	\$15,000.00	
ADAMS		15,000.00	15,000.00	15,000.00	
Miscellaneous					
SALES	.12	7,653.18	7,653.30	8,038.17	\$384.87*
Total	.12	\$37,653.18	\$37,653.30	\$38,038.17	\$384.87*
CLASSIFIED DISBURSEMENTS		Hatch	Adams	Miscellaneous	
Salaries		\$10,580.67	\$11,099.88	\$ 3,288.24	
Labor		1,371.59	1,104.92	1,895.15	
Postage and Stationery		194.85	13.45	11.45	
Freight and Express		52.75	128.98	13.23	
Heat, Light, Water		39.96	37.52		
Chemical Supplies		277.49	656.26		
Seeds, Plants, Sundry Supplies		105.97	283.45	270.68	
Fertilizer		8.12			
Feeding Stuffs		1,760.63	80.00	1,179.05	
Tools, Implements, Machinery		20.70	59.47		
Furniture and Fixtures		52.13	40.83		
Scientific Apparatus		283.24	885.78		
Live Stock		199.75		80.50	
Traveling Expense		52.15	202.85	3.65	

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Library	5.17	2.00
Buildings and Lands.....	400.74	947.39
Equipment		346.83
Contingent Expense70	
Total Disbursements.....	\$15,000.00	\$15,000.00
		\$ 8,038.17
Balance—Deficit—June 30, 1914.....		384.87*

*This amount was taken care of immediately after July 1.

Table VI.—Receipts and Disbursements for Year Ending December 31, 1912.

(Not submitted in 1912 report.)

	Crop Pest	Scientific Investigation
Balance January 1, 1912.....	\$ 7,192.19	\$ 3,844.12
State Appropriation	15,000.00	10,000.00
Total Available	\$22,192.19	\$13,844.12
DISBURSEMENTS		
Salaries	\$12,126.84	\$ 7,844.66
Labor	912.00	674.46
Publications	999.19	5.81
Postage and Stationery	110.26	92.99
Freight and Express	99.72	43.47
Heat, Light, Water.....	39.36	113.47
Chemical Supplies	125.13	2.65
Sundry Supplies	1,174.04	557.59
Fertilizer .....	.85	15.45
Feeding Stuffs		1,613.35
Library	1,501.53	34.00
Tools, Machinery	131.60	655.56
Furniture and Fixtures	151.06	26.50
Scientific Apparatus	240.27	94.65
Live Stock		1,495.17
Traveling Expense	1,008.73	30.20
Contingent Expense		6.50
Buildings and Repairs	13.59	295.99
Total	\$18,634.17	\$13,602.47
Balance December 31, 1912.....	\$ 3,558.02	\$ 241.65

Table VII.—Receipts and Disbursements for the Year Ending December 31, 1913.

	Crop Pest	Scientific Investigation
RECEIPTS		
Balance January 1, 1913.....	\$ 3,558.02	\$ 241.65
State Appropriation	15,000.00	10,000.00
Total	\$18,558.02	\$10,241.65
DISBURSEMENTS		
Salaries	\$ 8,482.44	\$ 5,344.10
Labor	786.34	349.72
Publications	3,703.67	
Postage, Stationery, and Telephone.....	114.45	70.26
Freight and Express	77.37	16.15
Heat, Light, Water.....	1.00	8.50
Chemical Supplies	76.88	465.80
Sundry Supplies	562.80	236.26
Fertilizer	12.45	
Feeding Stuffs		1,791.71
Library	262.07	
Tools, Machinery	19.85	224.74
Furniture and Fixtures	76.05	47.25
Scientific Apparatus	178.87	95.65
Live Stock		112.75
Traveling Expense	995.91	113.35
Contingent Expense		25.50
Buildings and Repairs		214.27
Total	\$15,350.15	\$ 9,116.01
Balance December 31, 1913.....	\$ 3,207.87	\$ 1,125.64

Table VIII.—Receipts and Disbursements January 1 to September 30, 1914.

RECEIPTS	Crop Pest	Investigation Scientific
Balance January 1, 1914.....	\$ 3,207.87	\$ 1,125.64
State Appropriation	15,000.00	10,000.00
Total Available	\$18,207.87	\$11,125.64
DISBURSEMENTS		
Salaries	\$ 8,316.83	\$ 4,578.42
Labor	524.51	250.20
Publications	100.71	61.66
Postage and Stationery	33.94	37.34
Telegraph and Telephone	13.45	14.70
Freight and Express	114.33	65.91
Chemical Supplies	102.20	213.25
Sundry Supplies	562.62	1,497.45
Fertilizer	19.01	
Feeding Stuffs		766.03
Library	786.05	7.00
Tools, Machinery	21.45	39.23
Furniture and Fixtures	132.18	159.77
Scientific Apparatus	418.88	404.76
Live Stock		1.00
Traveling Expense	685.41	169.15
Buildings and Repairs	17.75	25.02
Total	\$11,849.32	\$ 8,290.89
Balance September 30, 1914.....	\$ 6,358.55	\$ 2,834.75

Table IX.—Branch Experiment Stations.

January 1, 1913, to December 31, 1913.

Appropriation	Union Eastern Or.	Hermiston Umatilla	Moro Dry Farm	Harney Co. Burns	Southern Or. Talent River	Hood River	J. J. Astor
	\$7,500.00	\$3,000.00	\$2,500.00	\$4,000.00	\$5,000.00	\$3,000.00	\$3,000.00*
Disbursements							
Salaries	\$2,035.00	\$2,085.00	\$	\$2,020.36	\$2,199.19	\$1,713.87	
Labor	2,015.14	203.10	1,624.11	542.57	1,372.84	153.62	
Publications.....	20.00	4.05					
Postage and Stationery.....	36.70	23.97	45.96	119.48	30.71	62.37	
Freight and Express	2.68	49.33	24.82	211.95	94.38	17.68	
Heat, Light, Water	52.00		88.41		21.80	2.65	
Chemical Supplies			1.25				
Sundry Supplies	281.49	64.77	136.10	388.03	429.26	67.40	
Fertilizer			7.50	5.85	58.00		
Feeding Stuffs	139.96	4.96	88.68	35.20	250.59		
Library					2.45		
Tools, Implements, Machinery	257.25	37.00	145.55	312.00	67.55	391.60	
Furniture and Fixtures.....	25.80		36.75	26.50		71.90	
Scientific Apparatus				11.70			
Livestock	12.50		164.75	93.15			
Traveling Expense	11.90	143.15	1.25	179.50	13.15	333.40	
Contingent Expense	6.50	1.20			1.77	3.00	
Buildings and Repairs	2,601.53	86.11	132.43	52.77	414.60	180.00	
Total	\$7,498.45	\$2,702.64	\$2,497.56	\$3,999.06	\$4,956.29	\$2,997.49	None
Balance Dec. 31, 1913**.....	1.55	297.36	2.44	.94	43.71	2.51	\$3,000.00

*John Jacob Astor not used until 1914.

**Balances shown are covered by obligations.

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Table X.—Branch Experiment Stations.

January 1, 1914, to September 30, 1914.

Appropriation	Union Eastern Or.	Hermiston Umatilla	Moro Dry Farm	Harney Co. Burns	Southern Or. Talent	Hood River	J. J. Astor
	\$7,500.00	\$3,000.00	\$2,500.00	\$4,000.00	\$5,000.00	\$3,000.00	\$3,000.00
Disbursements							
Salaries	\$3,206.83	\$1,245.10	\$ 385.00	\$1,541.88	\$2,156.65	\$1,795.48	\$ 400.00
Labor	1,354.10	401.71	1,429.44	1,033.04	582.07	296.48	1,295.97
Postage and Stationery ..	16.15	10.50		5.38	31.19	53.90	
Freight and Express	29.42	9.40	7.41	49.56	68.54	11.00	
Heat, Light, Water	38.10	21.06				8.85	
Chemical Supplies			8.00			9.45	
Sundry Supplies	127.92	117.93	105.49	340.21	304.08	74.93	112.50
Fertilizer					41.15	47.35	
Feeding Stuffs			34.03	742.00	365.51		
Tools, Machinery	340.00	47.65	1.60	91.14	84.65	190.35	
Furniture and Fixtures	2.50				55.25		
Scientific Apparatus					4.75	30.55	
Live Stock				150.00			675.00
Traveling Expense	11.95	41.20		18.35	78.64	270.82	113.20
Buildings and Repairs	943.63	491.78	171.10	1.69	13.90	190.40	
Telegraph and Telephone	17.95	2.80	11.75	17.87	12.00	9.58	
Total	\$6,088.55	\$2,389.13	\$2,153.82	\$3,991.12	\$3,798.38	\$2,999.14	\$2,596.67
Balance Sept. 30, 1914	\$1,411.45	\$ 610.87	\$ 346.18	\$ 8.88	\$1,201.62	\$.86	\$ 403.33

Table XI.—Miscellaneous Receipts—Branch Experiment Stations.

January 1, 1913, to September 30, 1914.

RECEIPTS	Eastern Oregon Union	Umatilla Hermiston	Moro Dry Farm	Southern Ore. Talent
Balance January 1, 1913	\$ 6,075.18	\$ 650.56	\$ 343.96	\$
Sales, etc.	12,392.46		301.15	51.22
Total Receipts	\$18,467.64	\$ 650.56	\$ 645.11	\$ 51.22
DISBURSEMENTS				
Salaries	\$ 865.00	\$	\$	\$ 50.81
Labor	2,522.97		184.01	
Publications	5.50	14.25		
Postage and Stationery	21.45	1.39	24.28	.41
Telegraph and Telephone	6.95			
Freight and Express	91.91	3.88	47.42	
Heat, Light, Water	20.65			
Sundry Supplies	245.68	1.00	40.75	
Fertilizer	27.55			
Feeding Stuffs	68.65		53.50	
Tools, Machinery	128.76	590.10	138.25	
Furniture and Fixtures	3.45			
Scientific Apparatus	1.25			
Live Stock	6,455.75			
Traveling Expense	143.35	13.00	16.55	
Contingent Expense	4.20			
Buildings and Repairs	849.17	6.50	15.15	
Total Disbursements	\$11,462.24	\$ 630.12	\$ 519.91	\$ 51.22
Balance Sept. 30, 1914	\$ 7,005.40*	\$ 20.44	\$ 125.20	None

*Contracts for purchase of cattle will offset balance.

Table XII.—Hood River County Fund—Experiment Station.

Appropriation by Hood River County 1913.....		\$2,000.00
1914.....		\$2,000.96
Total Receipts		\$4,000.00
Disbursements to September 30, 1914.....		
Salaries	\$1,025.15	
Postage and Stationery	31.08	
Freight and Express	24.33	
Heat, Light, Water	22.26	
Chemical Supplies	91.66	
Sundry Supplies	69.75	
Library	94.34	
Tools, Machinery	37.80	
Furniture and Fixtures	132.90	
Scientific Apparatus	308.56	
Traveling Expense	277.49	
Building and Repairs	169.90	
Telegraph and Telephone	9.90	
Total Disbursements		\$2,295.12
Balance September 30, 1914.....		\$1,704.88

III—EXTENSION SERVICE.**Table XIII.—Receipts and Disbursements for the Calendar Year
Ending December 31, 1913.**

RECEIPTS		
State Appropriation 1913.....		\$25,000.00
DISBURSEMENTS		
Salaries	\$17,854.77	
Labor	547.52	
Publications	805.20	
Postage and Stationery	374.24	
Telephone and Telegraph	155.59	
Freight and Express	47.16	
Heat, Light, Water	22.87	
Office Supplies	31.00	
Sundry Supplies	1,434.09	
Library	13.80	
Tools, Machinery	427.05	
Furniture and Fixtures	290.68	
Traveling Expense	2,842.33	
Contingent Expense	153.70	
Total Disbursements		\$25,000.00

**Table XIV.—Receipts and Disbursements January 1, 1914, to
September 30, 1914.**

RECEIPTS		
State Appropriation		25,000.00
DISBURSEMENTS		
Salaries	\$ 7,076.52	
Labor	1,857.12	
Publications	961.73	
Postage and Stationery	385.58	
Telephone and Telegraph	187.50	
Freight and Express	82.10	
Chemical Supplies	104.34	
Sundry Supplies	514.87	
Feeding Stuffs	17.64	
Library .....	.75	
Tools, Machinery	25.50	
Furniture and Fixtures	264.60	
Scientific Apparatus	33.92	
Traveling Expense	1,737.87	
Total Disbursements		13,250.04
Balance September 30, 1914.....		\$11,749.96

Table XV.—Educational Extension.**AGRICULTURAL INSTITUTES--**

	1912 Jan. 1 to Dec. 31	1913 Jan. 1 to Dec. 31	1914 Jan. 1 to Sept. 30
State Appropriation	\$2,500.00	\$2,500.00	\$2,500.00
DISBURSEMENTS			
Salaries	100.00		
Labor	48.00	11.65	43.50
Publications	170.18	42.11	
Postage and Stationery.....	29.11	17.18	.27
Freight and Express.....	16.25		
Chemical Supplies.....	12.00		
Sundry Supplies.....	104.31	204.11	2.85
Feeding Stuffs	1.30		
Tools, Machinery.....	45.37		
Furniture and Fixtures.....	7.50		
Scientific Apparatus	10.00		
Traveling Expense.....	1,955.98	2,219.95	1,285.44
Contingent		5.00	
Total	\$2,500.00	\$2,500.00	\$1,332.06
BALANCE	None	None	\$1,167.94

Table XVI.—Cooperative Dairy Demonstration.**Receipts and Disbursements to September 30, 1914.**

RECEIPTS	
State Appropriation 1913-1914 (two years)	\$5,000.00
DISBURSEMENTS	
Salaries	\$ 548.71
Labor	27.55
Publications	13.85
Postage and Stationery	10.92
Telephone and Telegraph	12.66
Freight and Express	6.88
Sundry Supplies	24.55
Tools, Machinery	43.04
Furniture and Fixtures	41.90
Scientific Apparatus	14.50
Traveling Expense	1,236.43
Building and Repairs (Rents).....	30.00
Total Disbursements	\$2,010.99
Balance September 30, 1914	\$2,989.01

Table XVII.—Cooperative Farm Management.**Receipts and Disbursements to September 30, 1914.**

RECEIPTS	
State Appropriation 1913-1914 (two years).....	\$5,140.00
Salaries	\$1,151.03
Labor	48.68
Postage and Stationery	3.95
Telephone and Telegraph	4.45
Sundry Supplies	5.00
Furniture and Fixtures	36.95
Traveling Expense	751.30
Total Disbursements	\$2,001.36
Balance September 30, 1914	\$3,138.64

Table XVIII.—State Club—Extension.

Receipts and Disbursements to December 10, 1914.

RECEIPTS		
State Appropriation 1914		\$2,700.00
DISBURSEMENTS		
Salaries	\$ 166.84	
Labor	67.48	
Publications	38.10	
Postage and Stationery	5.00	
Sundry Supplies	4.00	
Furniture and Fixtures	36.55	
Traveling Expense	393.00	
Total Disbursements		710.97
Balance December 10, 1914.....		\$1,989.03

Table XIX.—Coos County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1913-14	\$2,000.00	\$2,000.00
DISBURSEMENTS		
Salaries	\$ 875.00	\$1,000.00
Labor	7.25	
Heat, Light, Water	2.00	
Sundry Supplies	12.80	
Furniture and Fixtures	44.50	
Traveling Expense	259.90	
Building and Repairs	22.00	
Telephone and Telegraph	12.65	
Total Disbursements	\$1,236.10	\$1,000.00
Balance December 10, 1914.....	\$ 763.90	\$1,000.00

Table XX.—Crook County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1914	\$1,500.00	\$1,500.00
DISBURSEMENTS		
Salaries	\$	\$1,125.00
Labor	13.60	
Postage and Stationery	9.25	
Freight and Express	1.00	
Sundry Supplies	1.00	
Tools, Machinery	36.40	
Furniture and Fixtures	46.50	18.00
Traveling Expense	302.15	
Building and Repairs	6.00	
Telephone and Telegraph	14.10	
Total Disbursements	\$ 429.40	\$1,143.00
Balance December 10, 1914.....	\$1,070.60	\$ 357.00

Table XXI.—Harney County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1913-14	\$2,000.00	\$2,000.00
DISBURSEMENTS		
Salaries	\$ 451.98	\$1,197.18
Labor	800.76	
Postage and Stationery	34.82	
Freight and Express	40.85	
Sundry Supplies	173.97	
Tools, Machinery	79.85	
Traveling Expense	386.58	
Contingent Expense	23.10	
Building and Repairs	1.69	
Total Disbursements	\$1,993.60	\$1,197.18
Balance December 10, 1914.....	6.40	802.82

Table XXII.—Jackson County Educational Extension.

RECEIPTS	State Appropriation	County Appropriation
1914	\$2,000.00	\$2,000.00
DISBURSEMENTS		
Salaries	\$ 999.96	\$ 249.99
Postage and Stationery	1.00	
Sundry Supplies	6.00	13.25
Tools, Machinery	543.92	485.04
Furniture and Fixtures	122.63	
Traveling Expense	74.20	114.24
Building and Repairs	22.00	20.00
Total Disbursements	\$1,769.71	\$ 882.52
Balance December 10, 1914.....	\$ 230.29	\$1,117.48

Table XXIII.—Klamath County Educational Extension.

Receipts and Disbursements to December 10, 1914.

RECEIPTS	State Appropriation	County Appropriation (Paid in)
1913-14	\$2,000.00	\$1,000.00*
DISBURSEMENTS		
Salaries	\$ 495.03	\$ 948.00
Postage and Stationery	14.30	
Freight and Express	17.05	
Sundry Supplies	81.85	
Fertilizer	16.87	
Tools, Machinery	138.25	
Furniture and Fixtures	83.75	
Traveling Expense	131.35	
Building and Repairs	5.00	
Total Disbursements	\$ 983.45	\$ 948.00
Balance December 10, 1914.....	\$1,016.55	\$ 52.00

*\$1000 balance due

Table XXIV.—Lane County Educational Extension.

Receipts and Disbursements to December 10, 1914.

RECEIPTS	State Appropriation	County Appropriation (Paid in)*
1914	\$2,000.00	\$1,500.00
DISBURSEMENTS		
Salaries	\$ 600.00	\$ 648.39
Labor	20.00	
Postage and Stationery	22.45	2.60
Freight and Express	21.83	1.00
Sundry Supplies	42.54	
Tools, Machinery	30.00	539.70
Furniture and Fixtures	50.75	
Traveling Expense	456.45	48.21
Equipment	144.00	
Telephone and Telegraph	11.50	.25
Total Disbursements	\$1,399.52	\$1,240.15
Balance December 10, 1914.....	\$ 600.48	\$ 259.85

*\$500 balance due

Table XXV.—Malheur County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation (Paid in)*
RECEIPTS		
1913	\$1,500.00	\$1,125.00
1914	1,500.00	
Total Receipts	\$3,000.00	\$1,125.00
DISBURSEMENTS		
Salaries	\$ 250.00	\$ 750.00
Labor	6.60	
Postage and Stationery	9.20	
Freight and Express	1.15	
Sundry Supplies	5.95	
Tools, Machinery	79.90	
Furniture and Fixtures	38.50	
Traveling Expense	286.85	
Telephone and Telegraph	1.50	
Total Disbursements	\$ 679.65	\$ 750.00
Balance December 10, 1914	\$2,320.35	\$ 375.00

* \$375.00 balance due.

Table XXVI.—Marion County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation
RECEIPTS		
1914	\$ 750.00	\$ 750.00
DISBURSEMENTS		
Salaries	\$ 627.30	\$ 422.70
Labor	6.85	4.60
Postage and Stationery		3.55
Freight and Express		3.55
Sundry Supplies	9.00	6.19
Tools, Machinery		41.00
Traveling Expense	106.85	203.38
Total Disbursements	\$ 750.00	\$ 684.77
Balance December 10, 1914	None	\$ 65.23

Table XXVII.—Tillamook County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation (Paid in)*
RECEIPTS		
1914	\$2,000.00	\$1,500.00
DISBURSEMENTS		
Salaries	\$ 300.00	\$ 900.00
Postage and Stationery	4.63	7.75
Freight and Express	1.56	
Sundry Supplies	18.74	4.84
Fertilizer	4.75	
Tools, Machinery	19.25	
Furniture and Fixtures	46.00	
Scientific Apparatus	70.50	
Traveling Expense	207.73	64.55
Telephone and Telegraph	5.85	
Total Disbursements	\$ 679.01	\$ 977.14
Balance December 10, 1914	\$1,320.99	\$ 522.86

* \$500 balance due.

Table XXVIII.—Union County Educational Extension.

Receipts and Disbursements to December 10, 1914.

	State Appropriation	County Appropriation (Paid in)*
RECEIPTS		
1913	\$ 500.00	\$ 500.00
1914	1,200.00	400.00
Total Receipts	1,700.00	\$ 900.00
DISBURSEMENTS		
Salaries	\$1,265.00	\$ 600.00
Labor		5.00
Postage and Stationery	10.90	6.10
Freight and Express	2.16	
Sundry Supplies	23.20	113.37
Tools, Machinery .....	.40	
Furniture and Fixtures	108.67	
Traveling Expense	280.40	139.40
Telephone and Telegraph	7.80	
Total Disbursements	\$1,698.53	\$ 863.87
Balance December 10, 1914	\$ 1.47	\$ 36.13

*\$800 balance due

Table XXIX.—Multnomah County Educational Extension.Receipts and Disbursements
1913

	* State appropriation	County appropriation*
RECEIPTS		
1913		
DISBURSEMENTS		
Salaries	\$ 500.00	

*The County fund of \$500.00, while expended under the supervision of the Extension Service, was not turned over to the institution; but accounts were audited in Multnomah County.

IV—MISCELLANEOUS FUNDS.**Table XXX.—Mining Bureau Receipts and Disbursements.**

	Jan. 1, 1912 to Dec. 31, 1912	Jan. 1, 1913, to Dec. 31, 1913
MINING BUREAU		
State Appropriation	\$1,000.00	\$1,000.00
DISBURSEMENTS		
Salaries	\$ 270.00	\$ 130.00
Labor	116.68	41.65
Publications	309.84	5.06
Postage and Stationery	1.65	63.60
Freight and Express	12.95	21.18
Sundry Supplies	2.00	2.80
Library		2.00
Tools, Machinery		4.00
Scientific Apparatus		568.35
Traveling Expense	286.88	161.36
Total	\$1,000.00	\$1,000.00

Table XXXI.—Pure Seed Fund.

Receipts and Disbursements to September 30, 1914.

RECEIPTS		
State Appropriation 1913-14		\$1,000.00
DISBURSEMENTS		
Salaries	\$ 928.34	
Office Supplies	5.00	
Traveling Expense	7.20	
Equipment	41.86	
Total Disbursements		982.40
Balance September 30, 1914		\$ 17.60

ESTIMATES OF REQUIREMENTS.

Estimates of financial requirements for the years 1915 and 1916 for (1) additional salaries, (2) general or miscellaneous maintenance, (3) repairs, (4) improvements, (5) equipment.†

Additional Instructors and Assistance.

Following is a list of instructors and assistance for each of the years 1915 and 1916, in addition to the present force for resident instruction:

	Additional Salary Requirements		
	1915	1916	Biennium
Professor of Farm Management.....	\$ 2,500	\$ 2,500	\$ 5,000
Instructor in Veterinary Medicine and Animal Husbandry	600*	1,200	1,800
Instructor in Dairy Husbandry	1,200	1,200	2,400
Instructor in Bacteriology .....	.....	1,200	1,200
Instructor in Poultry Husbandry	700*	700*	1,400
Instructor in Botany and Plant Pathology.....	1,200	1,200	2,400
Instructor in Zoology .....	.....	1,000	1,000
Instructor in Vegetable and Landscape Gardening.	1,000	1,200	2,200
Instructor in Veterinary Medicine	600*	1,200	1,800
Instructor in Highway and Experimental Engineering	1,500	1,500	3,000
Instructor in Mechanical Drawing	1,100	1,150	2,250
Instructor in Electrical Construction and Machine Shop	1,300	1,350	2,650
Metallurgist and Engineering Chemist.....	1,500	1,500	3,000
Instructor in Domestic Science	1,200	1,300	2,500
Instructor in Household Administration .....	.....	600*	600
Instructor in Domestic Art .....	.....	1,200	1,200
Instructor in Domestic Art	800	1,000	1,800
Instructor in Forestry	1,200	1,400	2,600
Instructor in Pharmacy	1,200	1,200	2,400
Instructor in Agricultural Economics	1,400	1,500	2,900
Instructor in Political Science	400*	600*	1,000
Instructor in Business Administration .....	.....	450*	450
Instructor in Chemistry of Foods	500*	1,000	1,500
Instructor in Agricultural Chemistry	1,200	1,400	2,600
Instructor in Mathematics and Physics	1,000	1,200	2,200
Instructor in English	600*	1,000	1,600
Instructor in Freehand Drawing	1,000	1,200	2,200
Teaching Fellow in Agronomy	500	500	1,000
Teaching Fellow in Bacteriology	500	.....	500
Teaching Fellow in Zoology	500	.....	500
Student Assistance in Zoology	200	100	300
Student Assistance in Horticulture	100	100	200
Student Assistance in Veterinary Medicine	150	150	300
Student Assistance in Engineering Laboratory....	100	100	200
Student Assistance in Agricultural Economics	100	100	200
Student Assistance in Political Science	150	150	300
Office Assistance in Business Administration....	400	400	800
Student Assistance in Chemistry	200	200	400
Stenographer in College Exchange	720	720	1,440
Miscellaneous labor in College Exchange.....	250	250	500
	\$27,570	\$34,720	\$62,290

†For discussion and recapitulation of financial requirements, see statement beginning on page XLVII.

*Part time.

General or Miscellaneous Maintenance.

Summary of requirements for general or miscellaneous maintenance. The requirements for class, laboratory, and shop supplies are excluded, as these items are completely covered by student class, laboratory, and shop fees.

Janitorial, including salaries, labor, supplies, etc.....	\$13,100	
Heating, including salaries, labor, supplies, etc.....	13,750	
Campus and Greenhouses, salaries, labor, supplies, etc.....	7,000	
Publications	7,000	
Traveling expenses	5,500	
Light and power	5,000	
Water tax	1,500	
Summer school, including salaries of special instructors....	3,000	
Winter short courses	2,000	
Advertising	3,500	
Telephone and telegraph	1,000	
Office and sundry supplies	6,000	
Livery and auto hire, expenses of convocation speakers, commencement, etc.	750	\$ 69,100
Total for two years		\$121,400

Repairs.

Below is a summary of the repairs to the buildings listed. The estimates cover the necessary repairs including interior and exterior painting, re-finishing floors, repairing plastering, replacing window shades, refitting doors and windows, repairing down-spouts, roofs, roof gutters, etc.*

Administration Building	\$ 649	
Agricultural Building	1,438	
Agronomy Building	892	
Armory	760	
Cauthorn Hall	675	
Dairy Building	935	
Farm Mechanics	452	
Home Economics	525	
Horticultural Hall	815	
Mechanical Hall	1,530	
Mechanic Arts and Shops	1,033	
Men's Gymnasium	665	
Mines Building	579	
New Heating Plant	148	
Old Heating Plant	199	
Poultry Building	630	
Science Hall	1,767	
Women's Gymnasium	1,651	
Waldo Hall	2,708	
Stock Barn and Judging Pavilion.....	655	\$18,706

*The estimate by the Superintendent of Buildings of the repairs he considers desirable, aggregate \$46,600. These include, however, comparatively expensive repairs to the Armory, Waldo Hall, and Science Hall, some of which, it is thought, can be delayed for another biennium. The total given above is the least that will suffice to keep the buildings in reasonably good repair. In some of the buildings small allowances are made for repairing articles of equipment, such as desks, chairs, and other furniture in the various laboratories and class rooms.

Improvements.

Following is a summary of the most urgently needed improvements, exclusive of buildings, for the years 1915 and 1916:

Drives—

Jefferson Street extended to 26th Street, 1440 yards @ 50c per yard.....	\$ 792.00	
1620 lineal feet curb @ 35c.....	576.00	
Grading and miscellaneous	335.00	
Service drives in rear of Waldo Hall, 700 square yards @ 50c	350.00	
26th Street north to property line, 2,880 yards @ 50c	1,440.00	
Service drives to three entrances at rear of Agricultural Building, 440 square yards @ 50c, and miscellaneous	242.00	
Service drive, consisting of gravel, to Home Economics Building from north side.....	125.00	
Extension of drive running west, north of Home Economics Building, 1,387 square yards.....	776.00	
Service drive to Gymnasium, 310 square yards @ 50c	155.00	\$ 4,791.00

Walks—

810 feet walk, 8 feet wide, 6,480 square feet @ 10c..	\$ 648.00	
Cement walks in Poultry Plant, 3,750 square feet @ 10c, plus grading	425.00	
Concrete walk east of Home Economics Building, with approaches, 4,280 square feet @ 10c, plus grading	449.00	
Cement walks near Armory, including grading and excavation, 2,700 square feet	341.00	\$ 1,863.00

Campus General—

Grading south of new Gymnasium, seeding to lawn, including water pipes	\$1,240.00	
Grading and seeding lawns about Cauthorn Hall and Poultry Building, and west and south of Waldo Hall	425.00	
Grading and seeding west of Agricultural Building..	175.00	
Grading about Home Economics Building, and seeding to lawn	100.00	
Improving and seeding to lawn area near Armory on 16th Street, including planting of vines, etc.....	120.00	
Seeding to lawn areas near Mines Building.....	90.00	
Plowing, harrowing, finishing, and seeding west quadrangle	125.00	
Plantations around Dairy Building	200.00	\$ 2,475.00

Fire Protection Apparatus—

770 feet of 8-in. pipe in place @ 45c per foot.....	\$ 346.50	
1630 feet of 6-in. pipe in place @ 38c per foot.....	619.40	
720 feet of 4-in. pipe in place @ 32c per foot.....	230.40	
15 Corey Hydrants in place @ \$50 each.....	750.00	
20 cast iron tees to make connection	182.00	
19 gate valves	225.00	
30 feet 4-in. cast iron pipe @ 35c per foot.....	10.50	
175 chemical hand extinguishers @ \$8 each.....	840.00	
8 Pyrene extinguishers @ \$6 each.....	48.00	
16 pick axes @ \$1.50	24.00	
2 sixty-gallon hand chemical fire engines with hose and all necessary attachments	950.00	
300 lbs. of lead @ 9c per pound.....	27.00	
Structure for housing chemical engines.....	50.00	\$ 4,302.80

Poultry Husbandry—

For completion of poultry fencing	\$ 185.00	
Poultry houses	300.00	
Storage and service shed	250.00	
Water system	150.00	\$ 885.00

Plumbing—

Administration Building	\$ 175.00	
Armory	300.00	
Shops	200.00	
Waldo Hall	2,500.00	
Domestic Science Building	125.00	
Drinking Fountains	175.00	
Miscellaneous, in various buildings	340.00	\$ 3,815.00

Miscellaneous—

Permanent manure yard, with cement base for storage of all farm manure	\$ 600.00	
Fencing, 500 rods 4-ft. woven wire @ \$1.10 per rod..	550.00	
New stalls in east wing of dairy barn.....	400.00	\$ 1,550.00
Total		\$19,681.80

Equipment.

Following is a summary of estimated requirements for equipment for the years 1915 and 1916:

Furniture and miscellaneous articles of equipment for offices of Registrar, Business Office, President, Deans, College Exchange, etc.

\$ 2,350

Agronomy, including—

Field crops	\$1,479	
Farm Mechanics	683	
Drainage	250	
Irrigation	838	
Climatology	346	
Soils	1,126	
Farm and general	428	5,150

Animal Husbandry, including—

Machinery and tools	\$1,000	
Live stock	6,500	7,500

Bacteriology—

Scientific apparatus and cases	1,500
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Botany and Plant Pathology, including scientific apparatus, tables and cases, and herbarium

2,050

Dairy Husbandry, including—

Creamery equipment	\$1,528	
Laboratories	1,105	
Dairy production—farm implements and live stock.....	1,767	4,400

Entomology—scientific apparatus

750

Poultry Husbandry, including—

Apparatus, furniture, etc.	\$ 660	
Fowls for class demonstrations	200	860

Horticulture—apparatus, desks, etc.

1,050

Zoology and Physiology—scientific apparatus, student desks, chairs, etc.

1,325

Veterinary Science—scientific and special apparatus.....		1,650
Highway engineering		2,760
Irrigation engineering		897
Electrical engineering—		
General laboratory	\$1,875	
Standards laboratory	2,535	
Other electrical apparatus	1,870	6,280
Electrical construction		5,332
Mechanical engineering, Industrial Arts & Shops, including machine shop, woodwork shop, foundry, blacksmith shop, plumbing shop		5,135
Mining Engineering, including—		
Ore-dressing laboratory	\$ 700	
Assaying & Metallurgical Laboratories.....	800	
Ceramic laboratory	381	
Geology, Mineralogy, Petrology, and Petrography laboratories	750	2,631
Home Economics, including—		
Domestic science laboratories	\$2,471	
Domestic art laboratories	1,790	
Cafeteria	1,484	5,745
Forestry and logging engineering—scientific apparatus, transits, etc.		2,100
Experimental engineering, including—		
Materials laboratory	\$2,150	
Gas engineering laboratory	721	
Refrigeration engineering laboratory	450	
General equipment	141	
Steam engineering laboratory	560	
Power equipment and miscellaneous	999	5,021
Commerce, including—		
Business administration	\$ 149	
Economics and commercial museum	948	
Political Science	126	
Office training and business practice.....	462	
Bureau of organizations and markets.....	145	1,830
Pharmacy—scientific apparatus	\$2,025	
Chemistry—scientific apparatus, desks and plumbing.....	6,625	
Physics—scientific apparatus	1,240	
Mathematics and English—furniture, cabinets, blackboards, charts, and models	809	
Art and architecture—drawing stands, lockers, desks, stools, apparatus	1,816	
Library—filing cases or cabinets, etc.	632	
Physical education for men—apparatus	2,580	
Physical education for women—apparatus	2,952	
Military Science—ordnance including freight	300	
Print Shop—machinery, etc.	1,000	
Superintendent of buildings—general service equipment.....	735	
Total equipment for biennium		\$87,031

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